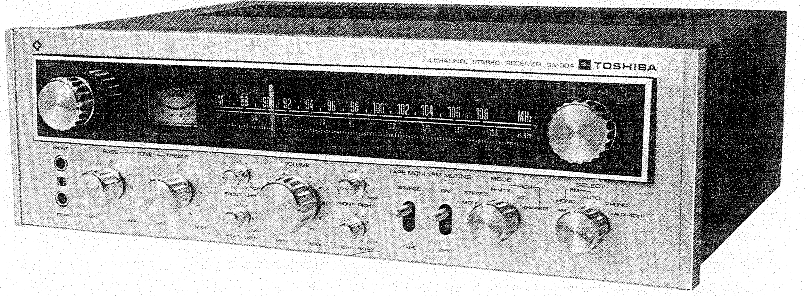
TOSHIBA 4 CHANNEL RECEIVER
SERVICE DATA
MODEL SA-304

FILE NO. 170-007



SPECIFICATIONS

■ AUDIO SECTION

Total IHF music power output:	70W (8Ω) 90W (4Ω) 85W (8Ω BTL)
Total r.m.s. continuous power output:	
Each channel driven:	15W x 4 (8Ω) 20W x 4 (4Ω) 30W x 2 (8Ω BTL)
4 channel driven:	10W x 4 (8Ω)
Harmonic distortion:	0.8% (at 1K Hz)
Frequency response:	20 ~ 40K ±3dB
Power band width (IHF) :	20 ~ 30K
Sensitivity	
Phono:	30mV (47K Ω)
AUX:	150mV (100K Ω)
TAPE PLAY:	150mV (100K Ω)
Channel separation:	45dB (at 1K Hz)
Recording output level	
REC (US pin) :	150mV
DIN:	30mV
Residual noise:	0.8mV
S/N	
PHONO:	65dB
AUX :	75dB
Tone control	
BASS:	±10dB (at 100Hz)
TREBLE:	∓10dB (at 10K Hz)
Acceptable speaker impedance:	4 ~ 16Ω (at 4SPKR) 8 ~ 16Ω (at 2SPKR)

■ FM TUNER SECTION

Sensitivity (IHF) :	2.5 μV
Distortion:	0.4% (400Hz MOD 10% MONO) 0.8% (400Hz MOD 45% STEREO)
S/N:	65dB
Frequency response:	20 ~ 15K Hz (±3dB)
Selectivity (IHF) :	45dB
Image ratio:	55dB
IF rejection ratio:	60dB
Capture ratio:	2.5dB
AM Suppression:	40dB
FM Stereo separation:	35dB (at 400 Hz)

■ AM TUNER SECTION

Sensitivity:	48dB/m 20μV (IHF)
Distortion:	1%
S/N	45dB
Selectivity	25dB (±10K Hz)
Image ratio:	35dB
IF rejection ratio:	30dB

■ GENERAL

Semiconductors:	FET 2 Transistor 66 Diode 37
Supply voltage:	100/117 (120)/220/240 V 50/60 Hz
Power consumption:	100 W
Dimensions W x D x H	400x290x115 (mm) 15-3/4 x 11-3/8 x 4½ (inch)
Weight:	8.2kg (18 lbs.)

TOKYO SHIBAURA ELECTRIC CO., LTD.
2-1, 5-CHOME, GINZA, CHUO-KU, TOKYO, JAPAN

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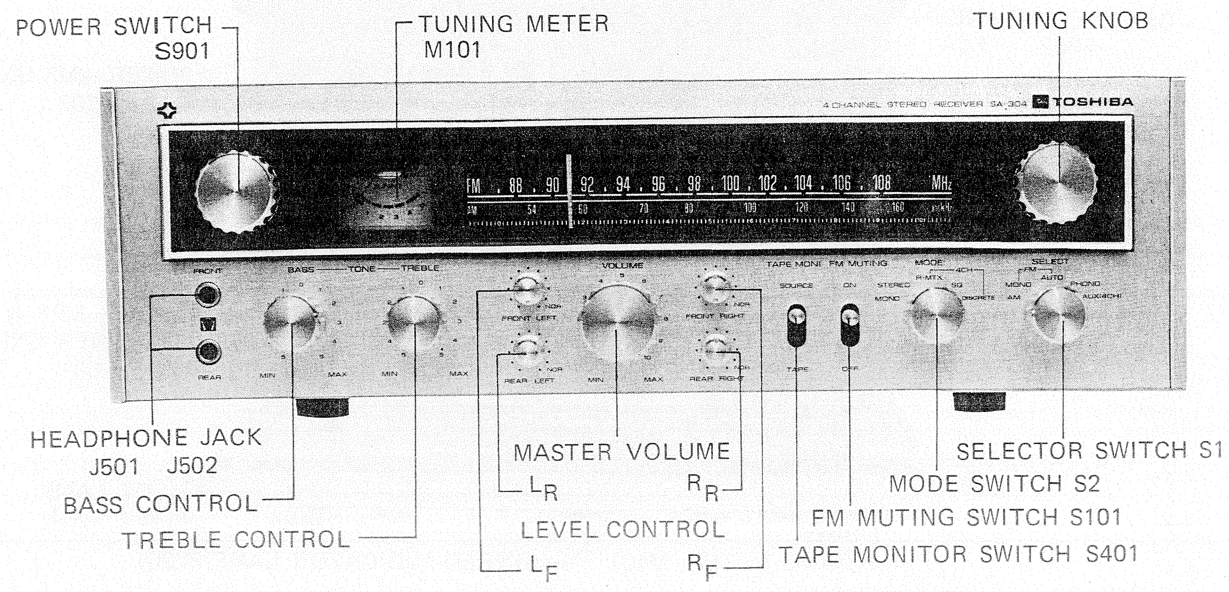
MODEL DESCRIPTIONS

TA; For U.S.A.
TC; For Canada
TE; For Europe
VL; For all other country except special

1. OPERATING CONTROLS

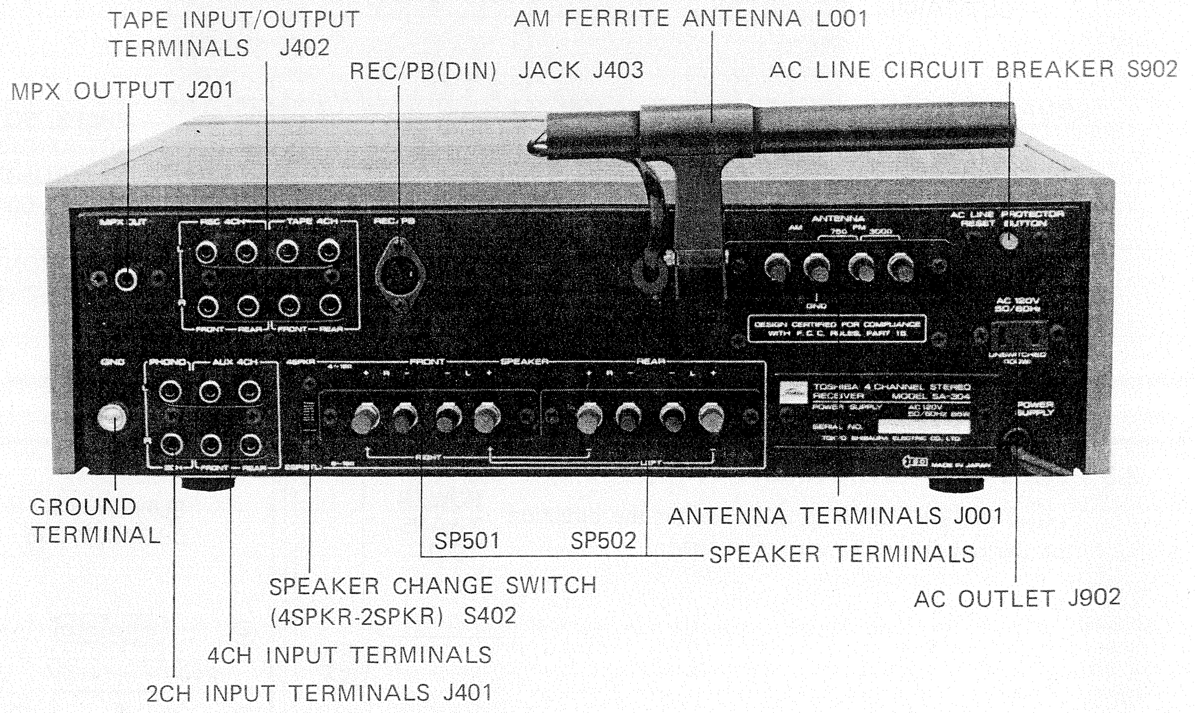
1-1 FRONT VIEW


POWER SWITCH
S901
TUNING METER
M101
TUNING KNOB
4 CHANNEL STEREO RECEIVER SA-304 TOSHIBA
HEADPHONE JACK
J501 J502
BASS CONTROL
TREBLE CONTROL
MASTER VOLUME
L_R
R_R
LEVEL CONTROL
L_F
R_F
SELECTOR SWITCH S1
MODE SWITCH S2
FM MUTING SWITCH S101
TAPE MONITOR SWITCH S401

L_R: Left (Rear) R_R: Right (Rear)

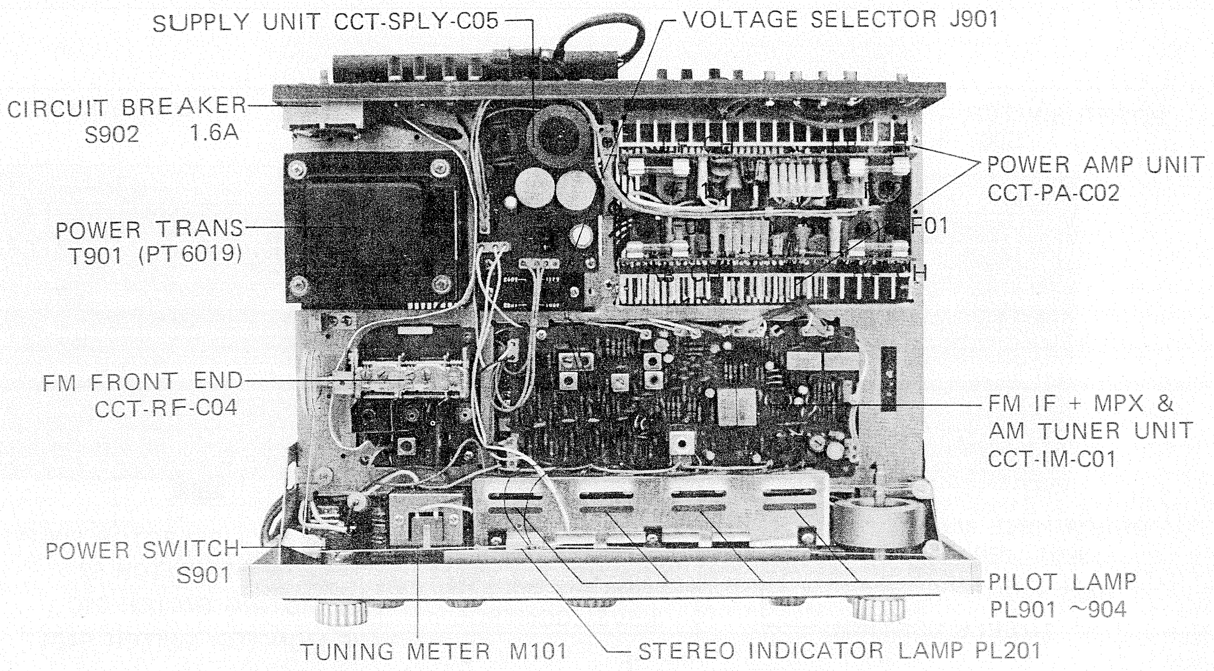
L_F: Left (Front) R_F: Right (Front)

1-2 REAR VIEW

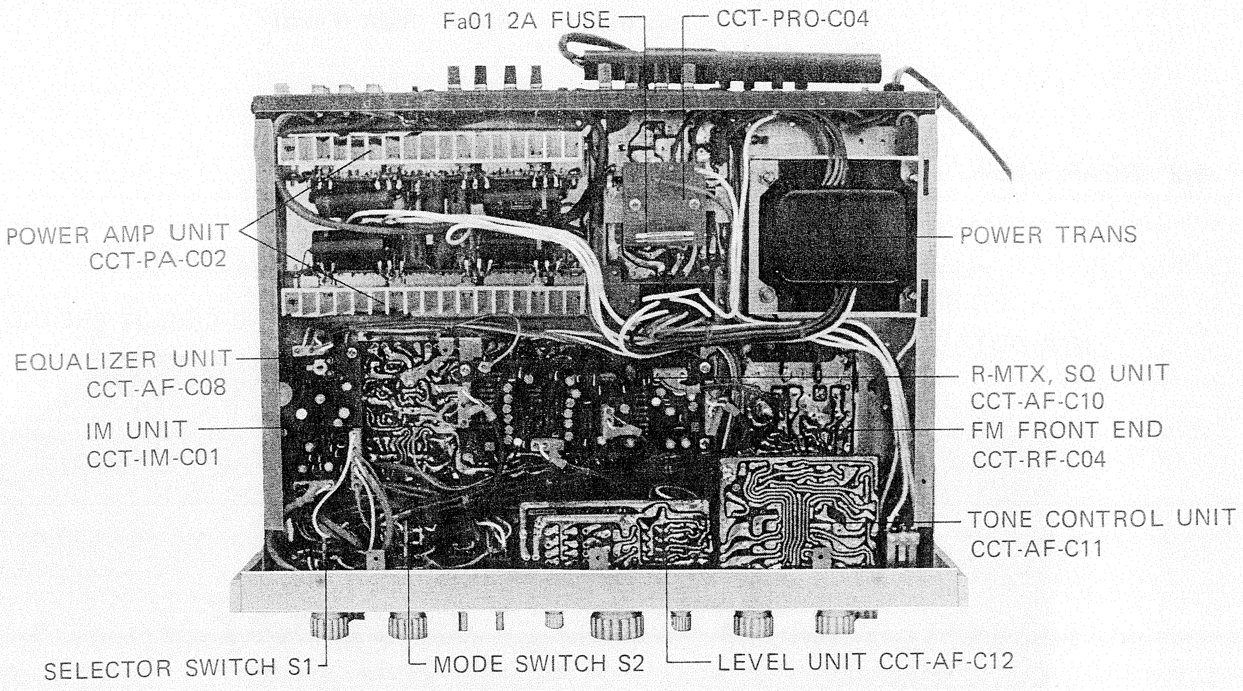

TAPE INPUT/OUTPUT
TERMINALS J402
AM FERRITE ANTENNA L001
REC/PB(DIN) JACK J403
AC LINE CIRCUIT BREAKER S902
MPX OUTPUT J201
GROUND
TERMINAL
ANTENNA TERMINALS J001
SP501
SP502
SPEAKER TERMINALS
SPEAKER CHANGE SWITCH
(4SPKR-2SPKR) S402
AC OUTLET J902
4CH INPUT TERMINALS
2CH INPUT TERMINALS J401

2. PARTS LOCATIONS

2-1 CHASSIS TOP VIEW

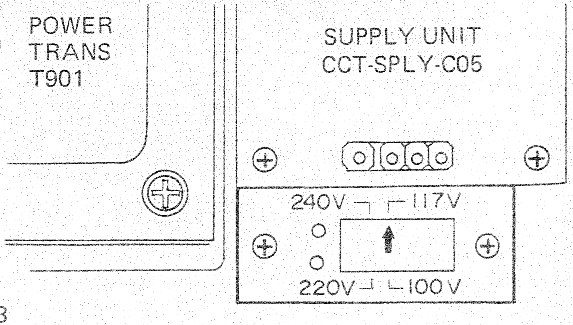

SUPPLY UNIT CCT-SPLY-C05
VOLTAGE SELECTOR J901
CIRCUIT BREAKER
S902 1.6A
POWER AMP UNIT
CCT-PA-C02
F01
POWER TRANS
T901 (PT6019)
H
FM FRONT END
CCT-RF-C04
FM IF + MPX &
AM TUNER UNIT
CCT-IM-C01
POWER SWITCH
S901
PILOT LAMP
PL901 ~904
TUNING METER M101
STEREO INDICATOR LAMP PL201

2-2 CHASSIS BOTTOM VIEW

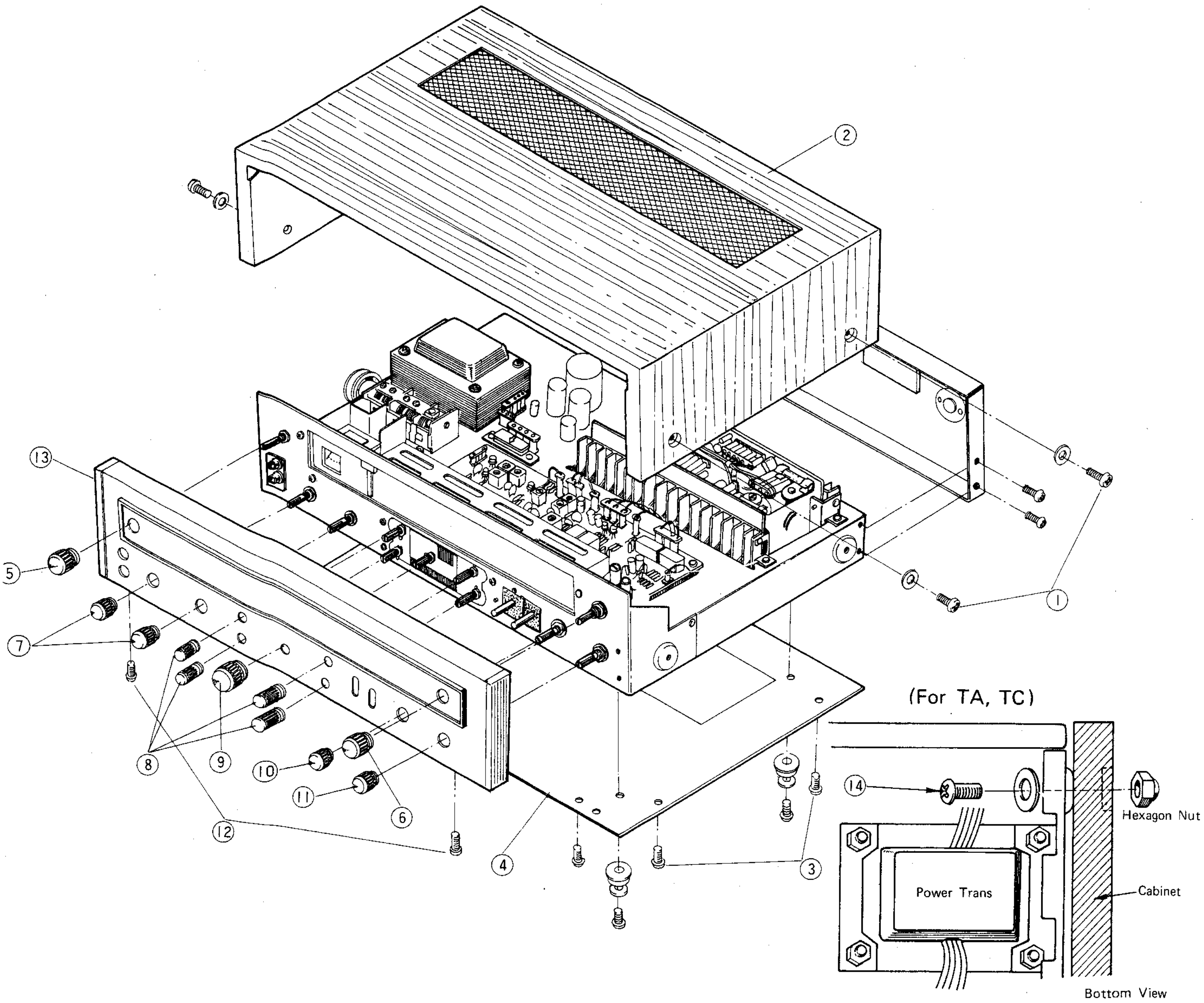

Fa01 2A FUSE
CCT-PRO-C04
POWER AMP UNIT
CCT-PA-C02
POWER TRANS
EQUALIZER UNIT
CCT-AF-C08
IM UNIT
CCT-IM-C01
R-MTX, SQ UNIT
CCT-AF-C10
FM FRONT END
CCT-RF-C04
TONE CONTROL UNIT
CCT-AF-C11
SELECTOR SWITCH S1
MODE SWITCH S2
LEVEL UNIT CCT-AF-C12

2-3 VOLTAGE ADJUSTMENT

Insert the pin, adjusting the arrow in the direction of the power supply voltage applied.


POWER
TRANS
T901
SUPPLY UNIT
CCT-SPLY-C05
240V
117V
220V
100V

3. DISASSEMBLY


②
⑬
⑤
⑦
⑧
⑨
⑩
⑪
⑥
⑫
④
③
①
(For TA, TC)
⑭
Hexagon Nut
Power Trans
Cabinet
Bottom View

3-1 CABINET REMOVAL (for without TA, TC)

1. Remove four screws ①.
2. Pull out the cabinet ②.

3-2 BOTTOM COVER REMOVAL

1. Remove eight screws ③.
2. Pull out the Bottom plate ④.

3-3 FRONT PANEL REMOVAL

1. Pull out knobs (Power ⑤, TUNING ⑥, TONE ⑦, LEVEL ⑧, VOLUME ⑨, MODE ⑩, SELECT ⑪).
2. Remove two screws ⑫.
3. Pull out the Panel ⑬.

(Note)

CABINET REMOVAL (for TA, TC)

1. Remove the bottom cover ④.
2. Remove one screw ⑭.

4. TECHNICAL POINTS

REGULAR MATRIX AND SQ

SQ

The signal elements (LT and RT) contained in the SQ record are shown in Fig. 1.

4 signals of LF, LB, RB and RF can be obtained by feeding these LT and RT signals to the decoder shown in Fig. 1b, the device to convert the signals incorporated in 2 channel into 4 channel signals.

The sound field obtained by this operation is the one with comparatively broad width and rather narrow depth. This unit is as shown in Fig. 2 designed to have mixing of LT and RT signals at a certain rate for improvement of the front and rear sound separation, that is, Front Left-Front Right, Front-Rear and Rear Left-Rear Right separation values are 14dB, 6dB and 6dB, respectively.

Composition of the signals, LT + 0.2RT, RT + 0.2LT, LT + 0.4RT and RT + 0.4LT is made at each circuit shown in Fig. 3a. Fig. 3b, Fig. 3c and Fig. 3d, respectively.

The loss occured in composing operation is compensated through amplification by Amplifiers TR04, TR03, TR06 and TR05 at the next stage.

The phase characteristic when activating the circuit illustrated in Fig. 4a is self-explaining in the above figure, showing almost the same phase as the input at low frequency and varying with a certain phase lag against the input with an increase in the frequency. Consequently it is possible to maintain the phase difference of 90° in a certain range by obtaining the phase difference between 2 similar circuits' phases which have 90° phase lag at f_1 and f_2, respectively. This is called "Phase Shift Circuit."

The rear signals LB' and RB' of this unit are composed through the "Phase Shift Circuits" shown in Fig. 5a and Fig. 5b, respectively, and the loss is compensated through amplification by TR09 and TR07 to get the same level.

Regular Matrix

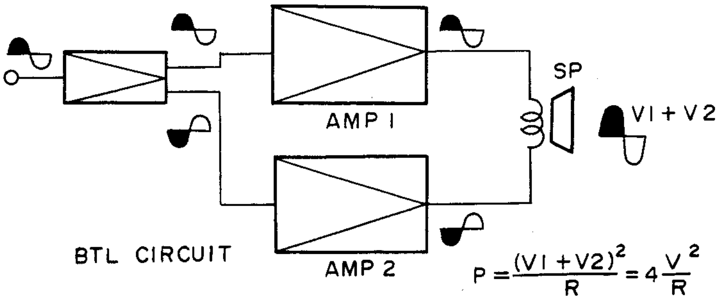
The circuit composition of the Regular Matrix System is designed so as to improve the sound field, which is originally wide in width and narrow in depth, into a square shape, making the mixing rate of Front Left and Right Channels signals the same as SQ system as shown in Fig. 3a and 3b. The Rear signals are as shown in Fig. 6 mixed at the rate, RB = R - 0.4L and LB = L - 0.4R.

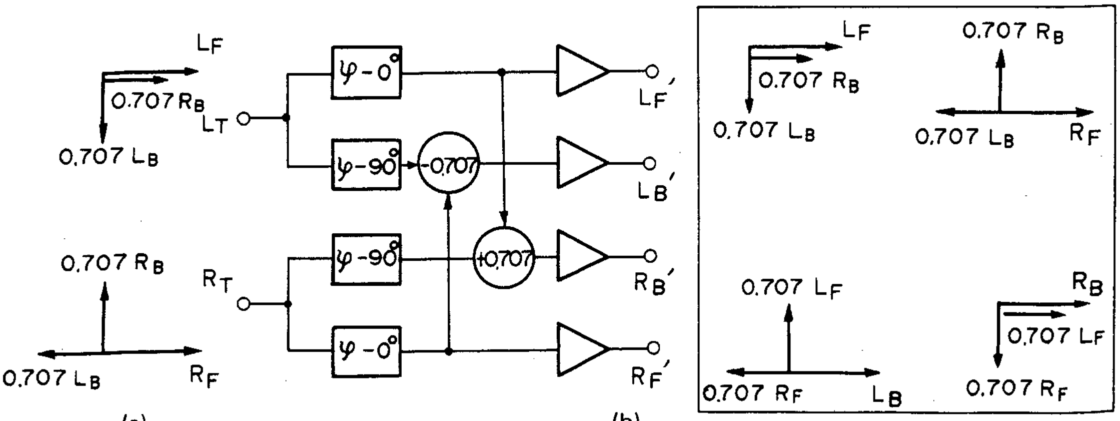
Pure Complementary Circuit System
See SA-500 Technical Points.
The Pure Complementary Circuit System of model SA-304 is made of the combination of 2SC1166-2SA661 and 2SD234-2SB434.

BTL CIRCUIT

When the four channel amplifier is used for reproduction with two speakers, this circuit is used in order to operate the four amplifiers effectively. The output voltage of two factors of magnitude can be supplied between the output terminals of each amplifier when the one speaker is operated in phase and the other out of phase with the use of the phase reverse circuit.

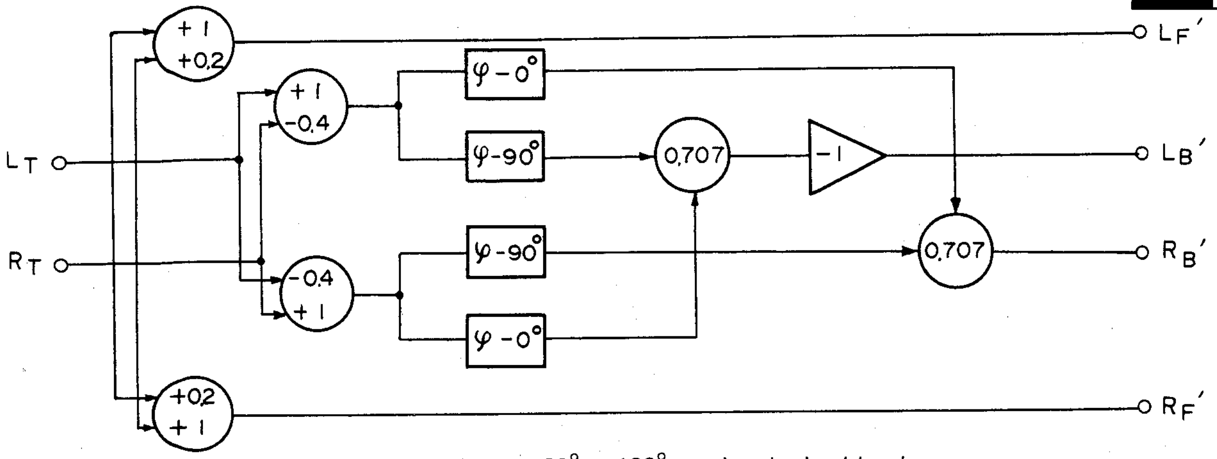
Although the output power is theoretically of the four factors of magnitude from the relation, $(2V)^2/R=4V^2/R$, that is in practice reduced to about two factors of magnitude due to losses such as the regulation of the transformer, the emitter resistance, etc.





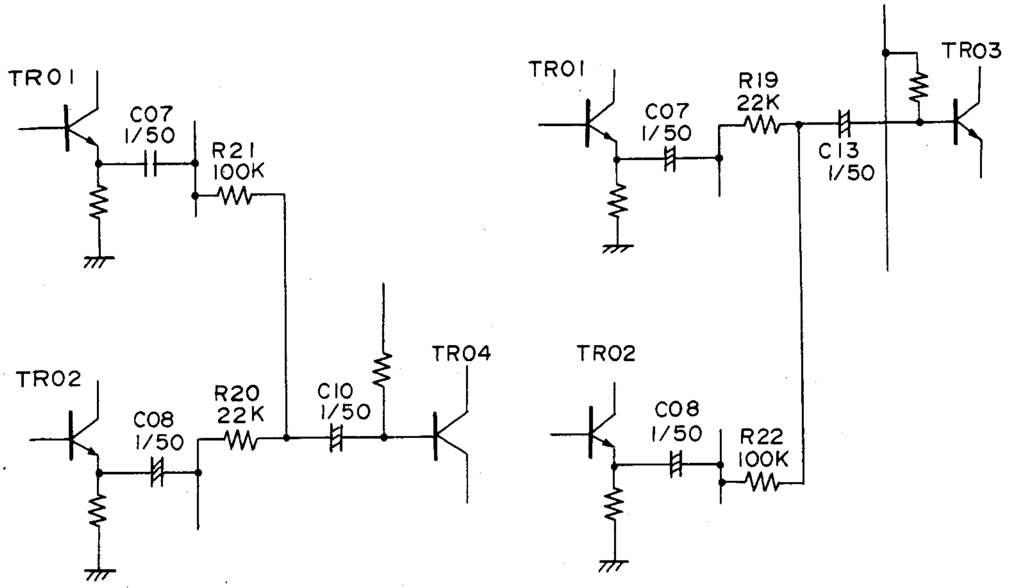
(a) (b)

Figure 1


+1
+0.2
+1
-0.4
-0.4
+1
+0.2
+1
LT
RT
φ-0°
φ-90°
φ-90°
φ-0°
0.707
-1
0.707
LF′
LB′
RB′
RF′

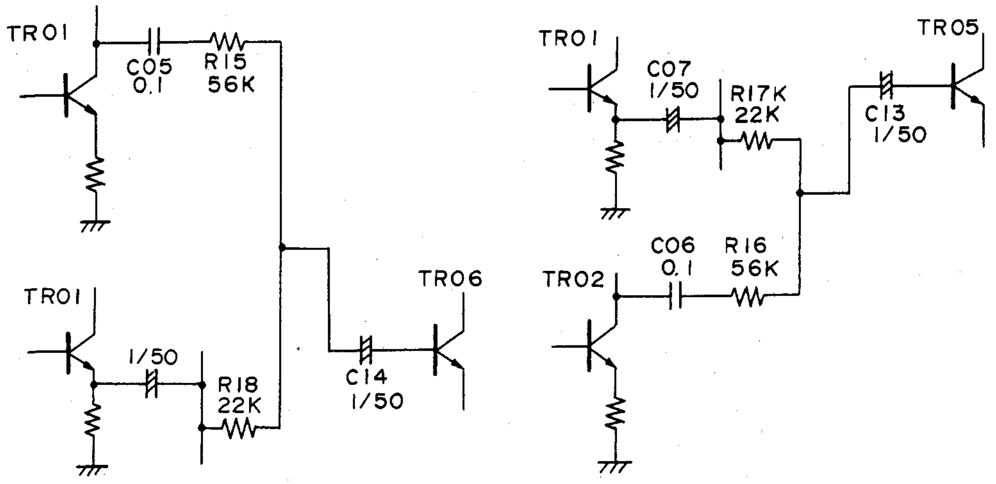
The phase difference 80° ~ 100° can be obtained by the frequencies within the range of 100Hz ~ 700Hz.

Figure 2


TR01
C07
1/50
R21
100K
TR02
C08
1/50
R20
22K
C10
1/50
TR04
TR01
C07
1/50
R19
22K
C13
1/50
TR03
TR02
C08
1/50
R22
100K

(a) LT + 0.2RT

(b) RT + 0.2LT


TR01
C05
0.1
R15
56K
TR01
1/50
R18
22K
C14
1/50
TR06
TR01
C07
1/50
R17K
22K
C13
1/50
TR05
C06
0.1
R16
56K
TR02

(c) LT - 0.4RT

(d) RT - 0.4LT

Figure 3

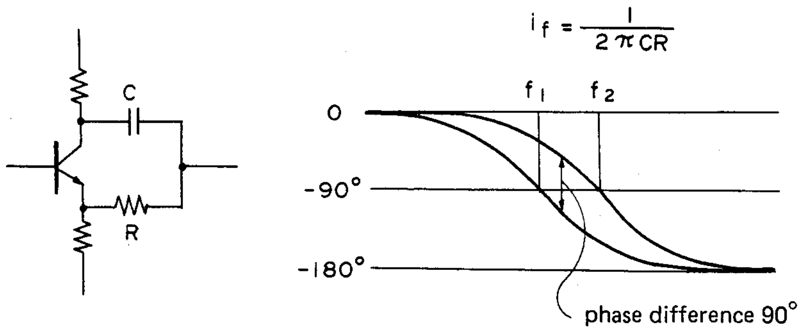
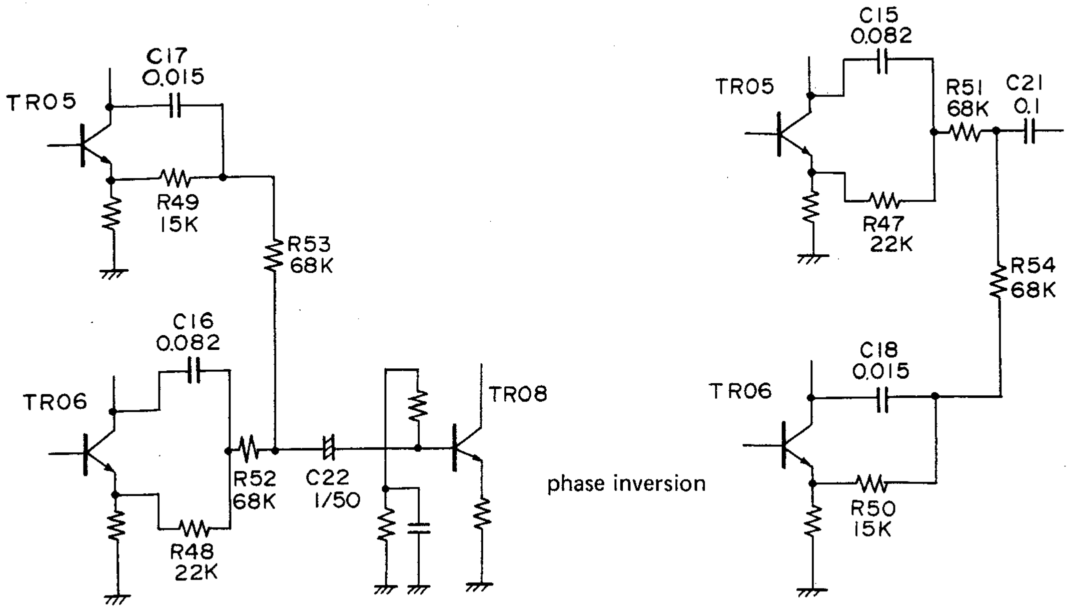

C
R
$f_f = \frac{1}{2\pi CR}$
f1
f2
0
-90°
-180°
phase difference 90°

Figure 4


C17
0.015
TR05
R49
15K
R53
68K
C16
0.082
TR06
R52
68K
C22
1/50
R48
22K
TR08
phase inversion
C15
0.082
TR05
R51
68K
C21
0.1
R47
22K
R54
68K
C18
0.015
TR06
R50
15K

(a) (b)

Figure 5

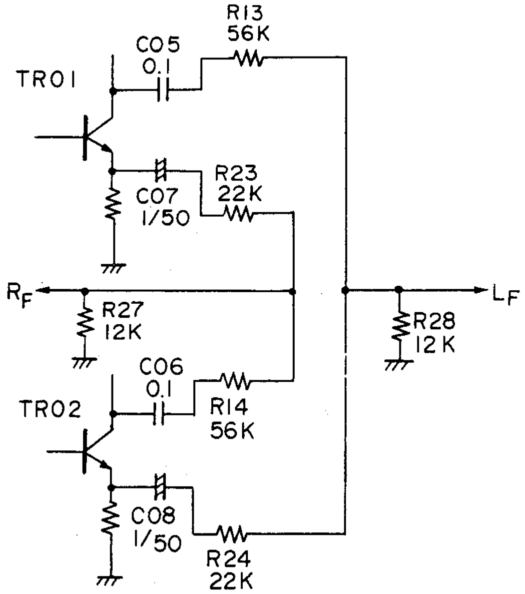

R13
56K
C05
0.1
TR01
R23
22K
C07
1/50
R_F
R27
12K
L_F
R28
12 K
C06
0.1
TR02
R14
56K
C08
1/50
R24
22K

Figure 6

5. CIRCUIT ADJUSTMENTS

5-1 AUDIO SECTION

Equipment:

1. Multimeter
2. Audio Generator
3. Oscilloscope
4. Electronic Voltmeter (AC-VTVM)

CAUTION:

Never short-circuit the speaker terminal. When a strong input is fed to the speaker or the speaker terminal is short-circuited, the output circuit is protected against the possible damage through the protection fuse (F01, F02). When the protection circuit worked, change the attached 1.6A Fuse after taking away the mistake.

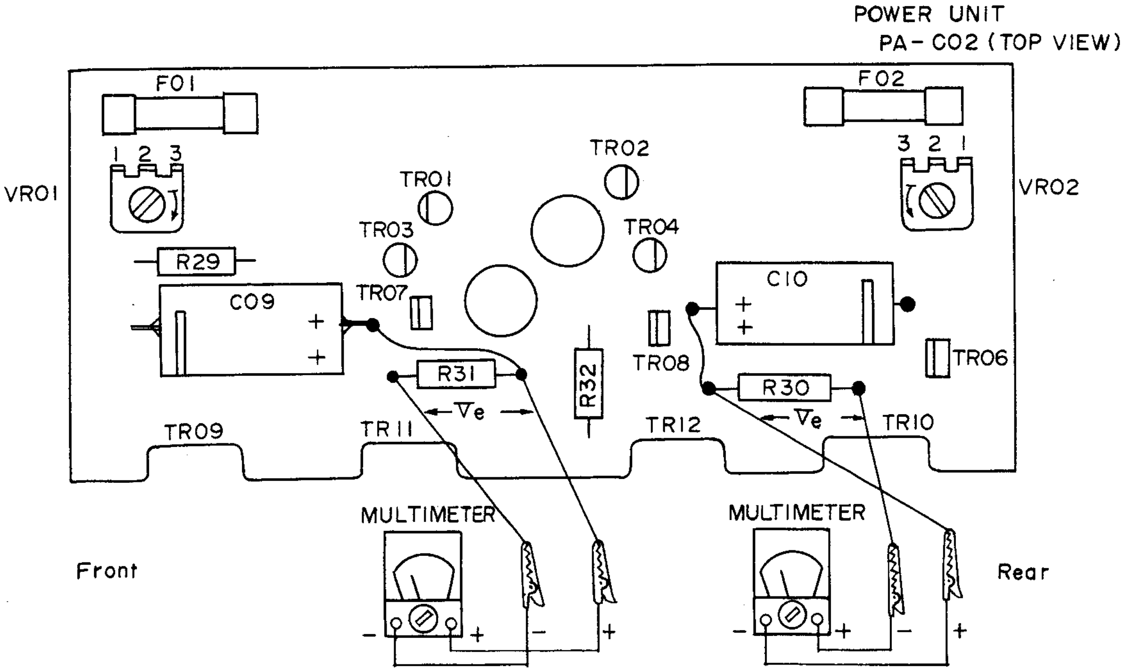

POWER UNIT
PA-CO2 (TOP VIEW)
F01
F02
1 2 3
3 2 1
VR01
VR02
TR01
TR02
TR03
TR04
R29
C09
TR07
C10
TR08
TR06
R31
R32
R30
Ve
Ve
TR09
TR11
TR12
TR10
MULTIMETER
MULTIMETER
Front
Rear
-
+
-
+

Figure 7

POWER AMP Ic IDLE ADJUSTMENT (See Fig. 7)

ADJUSTMENT		REMARKS
Front ch:	VR01 (500 ohm Potentio meter)	Adjust for Ve = 0.02 Volts. TR11 and TR10
Rear ch:	VR02	

Note. VR01 (VR02) should be preset to the counterclockwise (clockwise) before adjustment.

5-2 AM TUNER SECTION

Equipment:

1. SG (Signal Generator)
2. SG (Sweep Generator)
3. Test loop antenna (50 ohm)
4. Load (dummy load 8 ohm or speaker 8 ohm)
5. VTVM (AC)
6. Adjusting screw driver
7. Adjusting screw driver (use to antenna core)
8. Oscilloscope

AM ADJUSTMENT SET UP

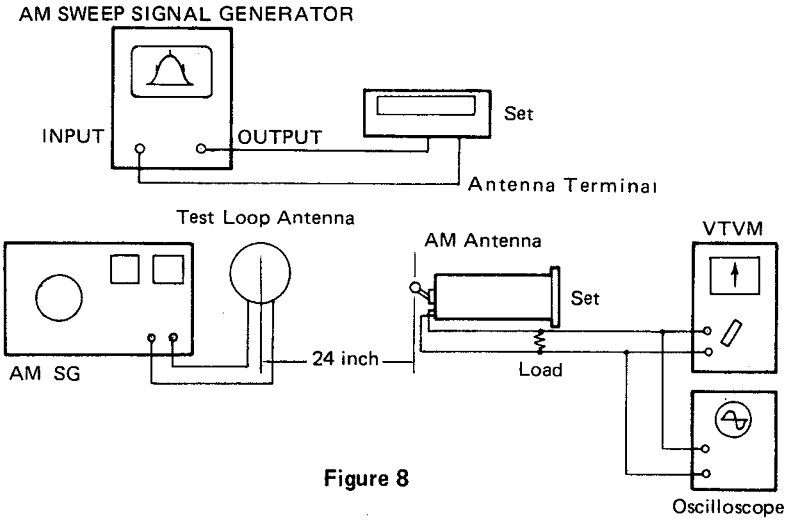


Figure 8

Note 1. Make adjustment of the AM tuner section with the minimum input signal possible to the set.

Note 2. It is not always necessary to set the IF center frequency to 455kHz as its range is determined by the ceramic filter used. Center frequency is within 455 ±2kHz.

AM IF ADJUSTMENT PROCEDURE

STEP	ADJUSTMENT	REMARKS
IF Response	IM-C01 IT03, IT04, IT05 IF Transformer	Adjust for scope pattern with specified marker (455KHz) as illustrated in Fig. 8.

AM ADJUSTMENT PROCEDURE (See Fig. 8)

Adjust the tuning gang to be able to deflect from 0 through 100 indication on the meter.

	GENERATOR CONNECTION	GENERATOR FREQUENCY	POSITION OF TUNING GANG	METERS	ADJUSTMENT	REMARKS
1	Connect loop antenna to signal generator and 24 inch away from the ferrite antenna.					
2	Loop antenna	540kHz	Set the tuning gang at 540kHz.	Connect to output terminals	IM-C01 L01 (OSC)	Adjust for max deflection on VTVM.
3	same	1600kHz	Set the tuning gang at 1600kHz.	same	RF-C04 VC01-4 (Trimmer)	same
4	Repeat steps 3 and 4 until no further improvement is noticed.					
5	Loop antenna	1400kHz	1400kHz	Connect to output terminals	RF C04 VC01-5 (Trimmer)	Adjust for max deflection on VTVM.
6	same	600kHz	600kHz	same	L001 coil on bar antenna for max.	L001 (Ferrite Antenna)
7	Repeat steps 5 and 6 until no further improvement is attained.					

5-3 FM TUNER SECTION

Equipment:

1. SG (Signal Generator)
2. SG (Sweep Marker Generator)
3. Dummy Antenna
4. Load (dummy load 8 ohm or speaker 8 ohm)
5. VTVM (AC)
6. Adjusting driver
7. Oscilloscope

FM ADJUSTMENT SETUP

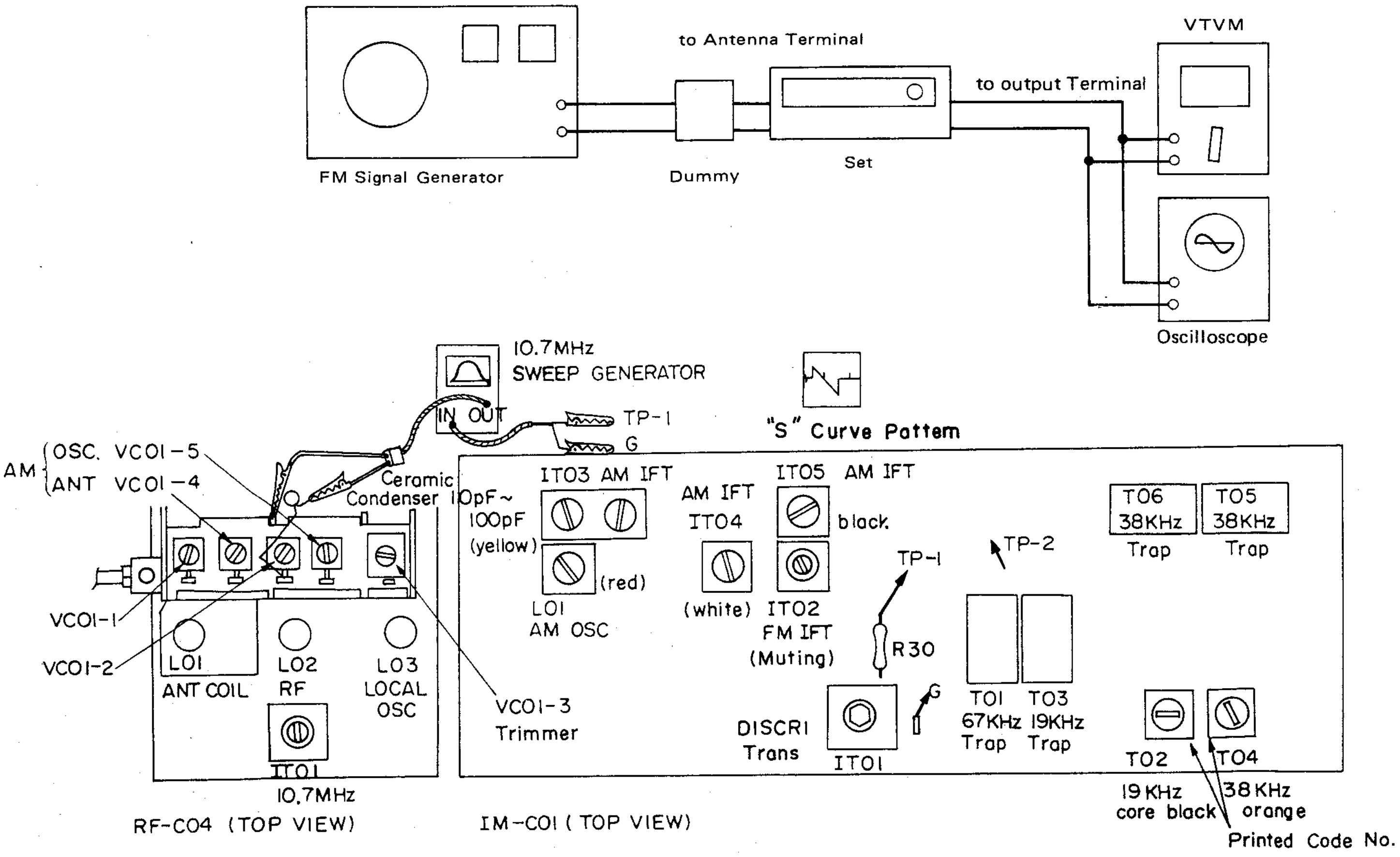

FM Signal Generator
Dummy
to Antenna Terminal
Set
to output Terminal
VTVM
Oscilloscope
10.7MHz
SWEEP GENERATOR
IN OUT
TP-1
G
"S" Curve Pattern
AM
OSC. VC01-5
ANT VC01-4
Ceramic Condenser 10pF ~ 100pF
VC01-1
VC01-2
L01
ANT COIL
L02
RF
L03
LOCAL
OSC
IT01
10.7MHz
RF-C04 (TOP VIEW)
VC01-3
Trimmer
IT03 AM IFT
(yellow)
(red)
L01
AM OSC
AM IFT
IT04
(white)
IT05 AM IFT
black
IT02
FM IFT
(Muting)
TP-1
TP-2
R30
G
DISCRI
Trans
IT01
T01
67KHz
Trap
T03
19KHz
Trap
T06
38KHz
Trap
T05
38KHz
Trap
T02
19KHz
core black
T04
38KHz
orange
Printed Code No.
IM-C01 (TOP VIEW)

Figure 9

FM IF ADJUSTMENT PROCEDURE (See Fig. 9)

STEP	ADJUSTMENT	REMARKS
"S" Curve	RF-C04 IT01 IM-C01 IT01 (lower & upper)	Adjust for symmetrical "S" curve as illustrated in Fig.9.

FM RF ADJUSTMENT PROCEDURE (See Fig. 9)

Adjust the tuning gang to be able to deflect from 0 through 100 indication on the meter.

STEP	GENERATOR FREQUENCY	POSITION OF TUNING GANG	ADJUSTMENT	REMARKS
1	88MHz	Set the tuning gang at 88MHz.	L03 (Local Osc.)	Adjust for maximum deflection on VTVM
2	108MHz	Set the tuning gang at 108MHz.	VC01-3 Trimmer	same as Step 1
3		88MHz	L01 (Ant Coil) L02 (RF Coil)	same as Step 1
4	108MHz	108MHz	VC01-1 VC01-2	same as Step 1
5	Repeat steps 3 and 4 until no further improvement is attained.			

Note:
The Receiver Frequency Range should not be below 87.5 MHz owing to the FTZ regulation.

If the above condition were not satisfied, adjust the Local Oscillator Coil L04 at the FM front end by turning it in the clockwise direction.

5-4 FM STEREO MULTIPLEX SECTION

Equipment:
1. FM Signal Generator
2. FM Stereo Modulator
3. VTVM (AC)
4. Oscilloscope

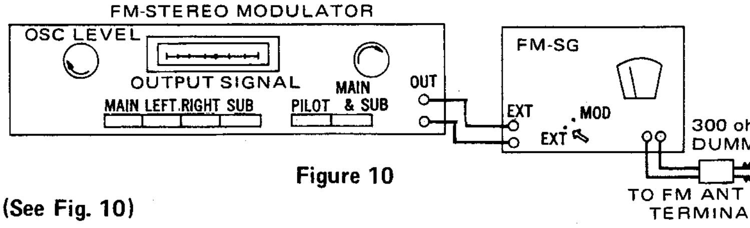


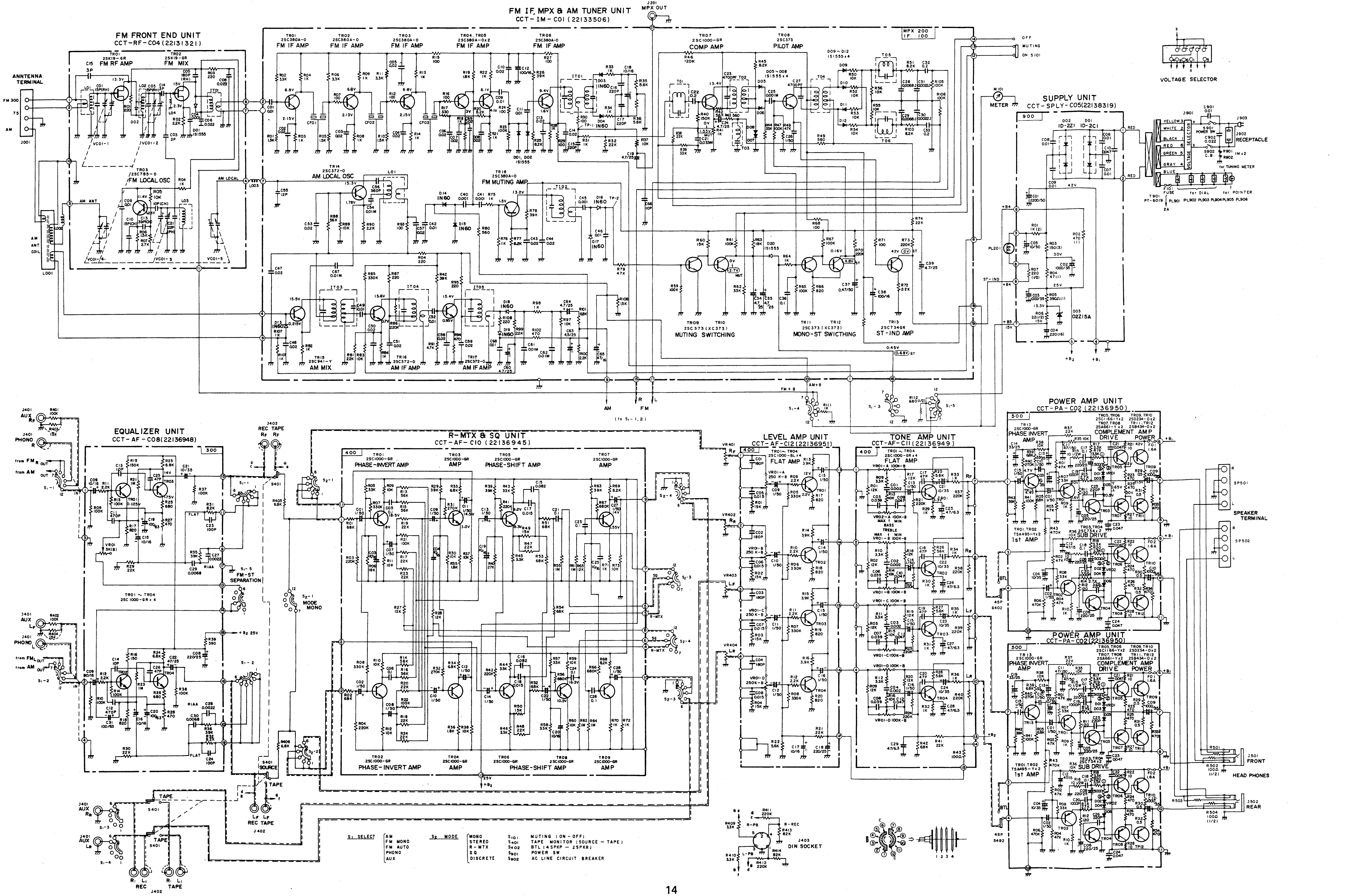
Figure 10

FM STEREO MULTIPLEX ADJUSTMENT PROCEDURE (See Fig. 10)

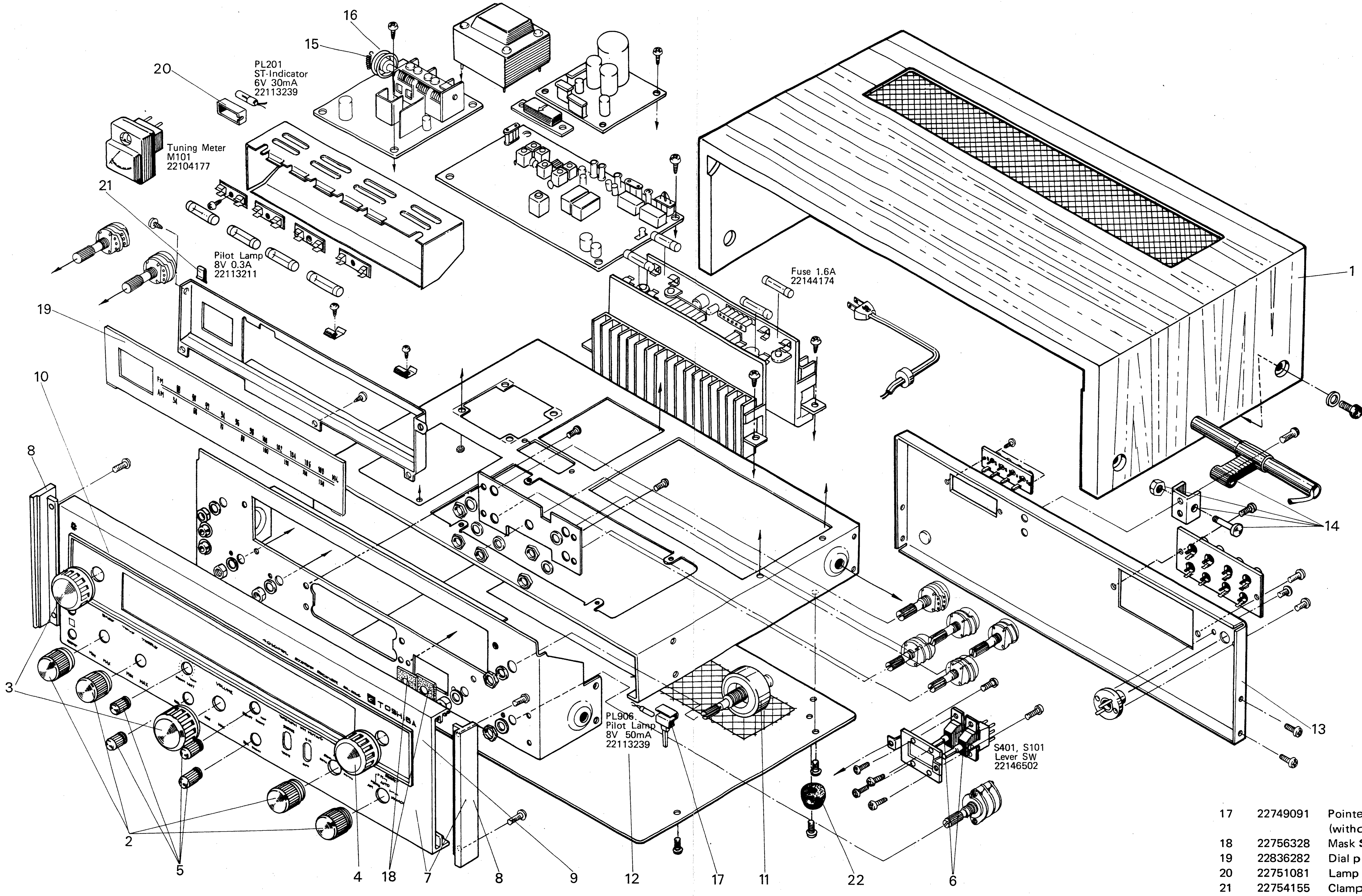
	ITEM		GENERATOR	REMARKS
1	19kHz Trap 67kHz, 72kHz SCA Rejection 38kHz Trap			None Adjust 19kHz T03 67kHz T01, 72kHz T07 38kHz T05, T06.
		1	For adjustment set-up, see Fig. 10.	
2	19kHz, 38kHz AMP	2	Connect VTVM to TP-4 (or TP-5) or OUTPUT Terminal.	
		3	FMSG 98MHz INPUT 60dB 19kHz 10% modulation sub channel 45% modulation	Adjust T02 (19kHz Transformer) and T04 (38kHz Transformer) to obtain maximum VTVM deflection.
3	Separation Control	1	For adjustment set-up, see Fig. 10.	
		2	Connect VTVM to OUTPUT (R).	
		3	FM SG 98MHz INPUT 60dB 19kHz 10% modulation (L+R) + 19kHz. 30% modulation L=R=400Hz or 1kHz	
		4	Set right channel to zero.	Adjust T04 (38kHz Transformer) a little to obtain minimum VTVM deflection. Adjust VR01 (AF−C08) to obtain good separation
		5	Connect VTVM to REC OUT (L).	
		6	Same as step 3	
		7	Set left channel to zero.	Same as step 4.
		8	Repeat steps 4 and 7.	

Note: Preset the semi-fixed resistor VR01 (AF-C08) to the midposition.

9. SCHEMATIC DIAGRAM


FM IF, MPX & AM TUNER UNIT
CCT-IM-C01 (22133506)
J201 MPX OUT
FM FRONT END UNIT
CCT-RF-C04 (22131321)
ANNTENNA TERMINAL
FM 300
75
AM
J001
FM RF AMP
FM MIX
FM LOCAL OSC
AM ANT
AM ANT COIL
L001
FM IF AMP
COMP AMP
PILOT AMP
MPX 200
IF 100
OFF
MUTING
ON S101
AM LOCAL OSC
FM MUTING AMP
MUTING SWITCHING
MONO-ST SWICTHING
ST-IND AMP
AM MIX
AM IF AMP
AM
FM
(to S1-1, 2)
VOLTAGE SELECTOR
M101 METER
SUPPLY UNIT
CCT-SPLY-C05 (22138319)
RECEPTACLE
for TUNING METER
F101 FUSE
for DIAL
for POINTER
T901 PT-6019
PL901 PL902 PL903 PL904 PL905 PL906
EQUALIZER UNIT
CCT-AF-C08 (22136948)
J401 AUX
J401 PHONO
from FM
from AM
FM-ST SEPARATION
J402 REC TAPE
R-MTX & SQ UNIT
CCT-AF-C10 (22136945)
PHASE-INVERT AMP
AMP
PHASE-SHIFT AMP
MODE MONO
S401 SOURCE
TAPE
REC TAPE
J402
LEVEL AMP UNIT
CCT-AF-C12 (22136951)
FLAT AMP
TONE AMP UNIT
CCT-AF-C11 (22136949)
FLAT AMP
BASS
TREBLE
POWER AMP UNIT
CCT-PA-C02 (22136950)
PHASE INVERT AMP
COMPLEMENT AMP
DRIVE
POWER
1st AMP
SUB DRIVE
BTL
4SP
S402
SP501
SP502
SPEAKER TERMINAL
J501 FRONT
HEAD PHONES
J502 REAR
J403 DIN SOCKET
S1 SELECT
AM
FM MONO
FM AUTO
PHONO
AUX
S2 MODE
MONO
STEREO
R-MTX
SQ
DISCRETE
S101 MUTING (ON-OFF)
S401 TAPE MONITOR (SOURCE — TAPE)
S402 BTL (4SPKP — 2SPKR)
S901 POWER SW
S902 AC LINE CIRCUIT BREAKER

10. CABINET EXPLODED VIEW

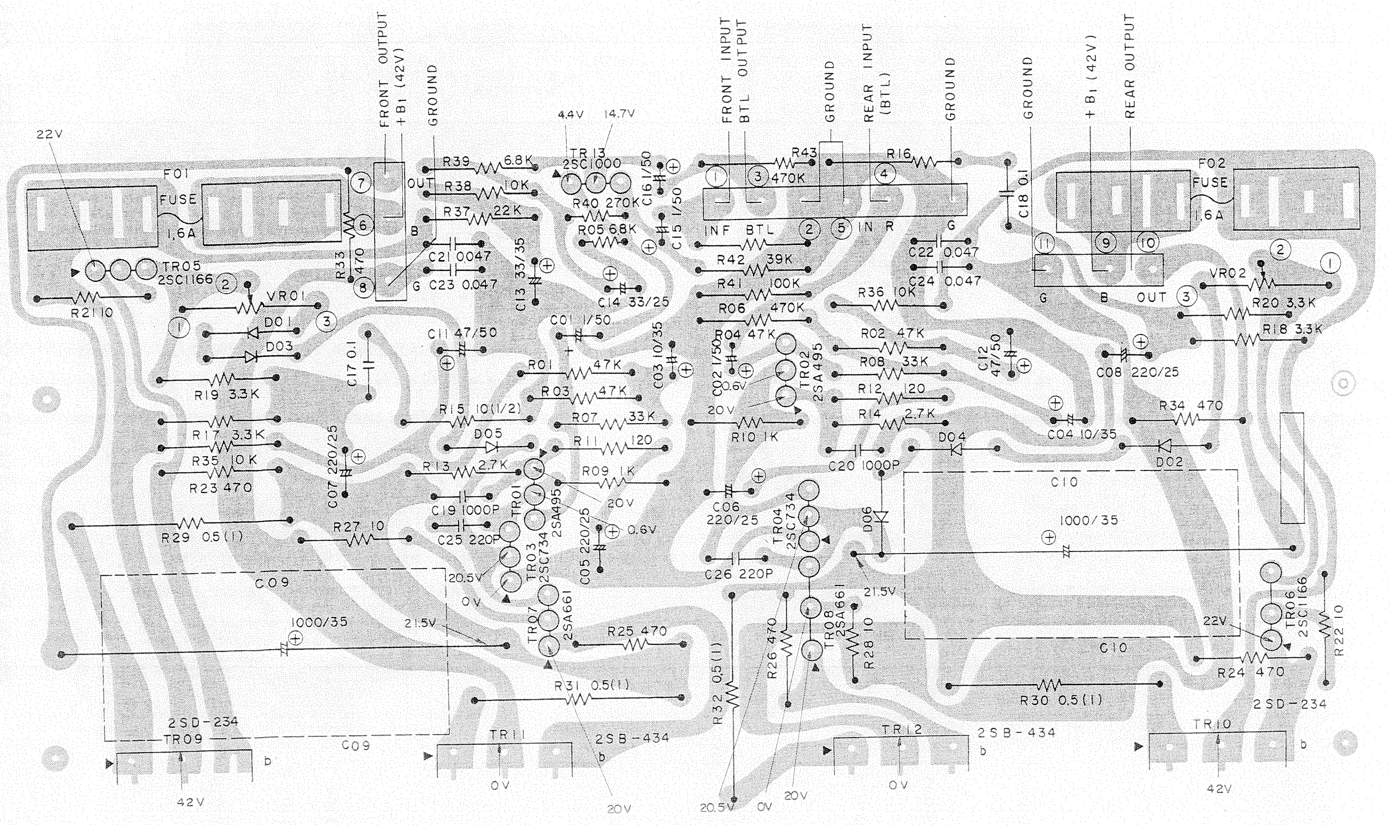

16
15
20
PL201
ST-Indicator
6V 30mA
22113239
Tuning Meter
M101
22104177
21
Pilot Lamp
8V 0.3A
22113211
19
10
8
Fuse 1.6A
22144174
1
14
13
3
2
5
4
18
7
8
9
PL906
Pilot Lamp
8V 50mA
22113239
12
17
11
22
S401, S101
Lever SW
22146502
6

CABINET PARTS

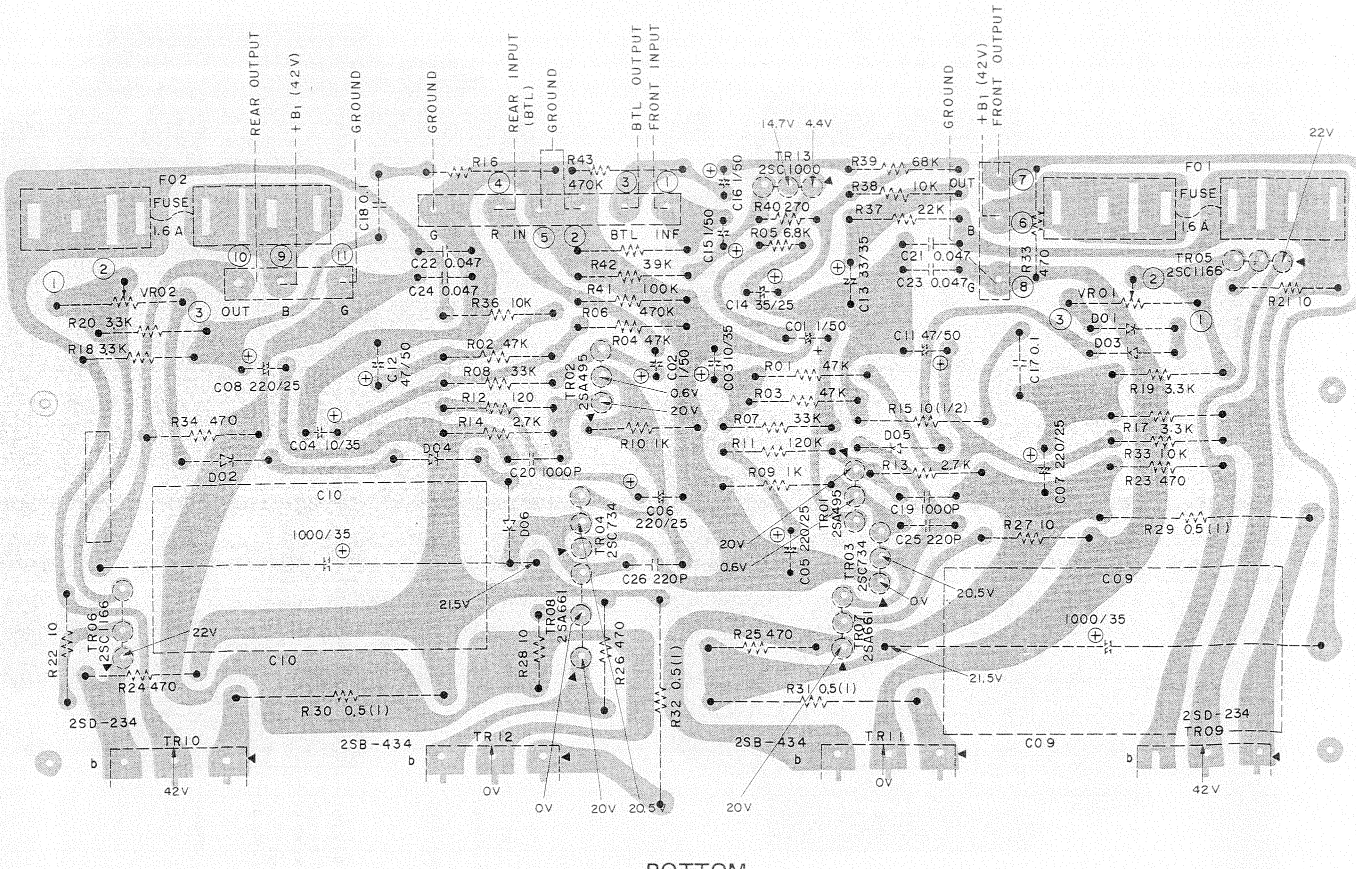
1	22819103	Wood Cabinet Case
2	22826090	Knob, Tone, Mode, Selector (4 used)
3	22826087	Knob, Power, Volume (2 used)
4	22824149	Knob, Tuning
5	22826091	Knob, Level (4 Used)
6	22845193	Knob, Lever Sw (2 used)
7	22843418	Panel Assembly Panel with Side Panel
8	22843428	Side Panel (2 used)
9	22838069	Decoration Frame
10	22837184	Dial Cover
11	22749108	Tuning Shaft Assembly
12	22842128	Back Cover
13	22711229	Jack Plate
14	22757025	Antenna Holder
15	20866009	Spring
16	22742071	Drum
17	22749091	Pointer Assembly (without lamp)
18	22756328	Mask Spacer (2 used)
19	22836282	Dial plate, Scale
20	22751081	Lamp Holder, ST-indicator
21	22754155	Clamp, scale
22	22828031	Leg (4 used)
		Package
	22924386	Package Box
	22932084	Cushion L
	22932085	Cushion R
	22947001	Keep
	22973122	Pad
		Accessory
	22124452	Antenna Feeder, FM
	22952426	Owner's Manual
	22990093	Cushion (Fert), Leg
	22999160	Cleaner Cloth

11. PRINTED CIRCUIT DIAGRAMS AND PARTS LISTS

11-1 POWER AMP CIRCUIT BOARD (CCT-PA-C02)

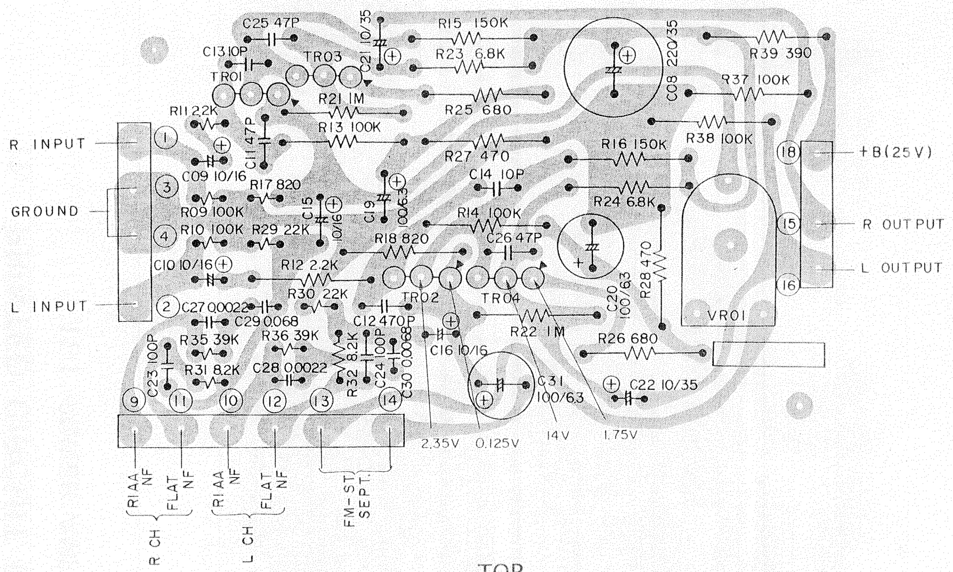

FRONT OUTPUT
+B1 (42V)
GROUND
FRONT INPUT
BTL OUTPUT
GROUND
REAR INPUT (BTL)
GROUND
GROUND
+B1 (42V)
REAR OUTPUT
22V
4.4V
14.7V
F01
FUSE
1.6A
TR05
2SC1166
R21 10
VR01
D01
D03
R19 3.3K
R17 3.3K
R35 10K
R23 470
R29 0.5(1)
R27 10
R33 470
OUT
B
G
R39 6.8K
R38 10K
R37 22K
C21 0.047
C23 0.047
C13 33/35
C11 47/50
C17 0.1
C07 220/25
TR13
2SC1000
R40 270K
R05 6.8K
C16 1/50
C15 1/50
C14 33/25
C01 1/50
C03 10/35
R01 47K
R03 47K
R15 10(1/2)
R07 33K
R11 120
D05
R13 2.7K
R09 1K
TR01
2SA495
C19 1000P
C25 220P
TR03
2SC734
C05 220/25
0.6V
20V
20.5V
0V
TR07
2SA661
R25 470
R31 0.5(1)
C09
1000/35
21.5V
2SD-234
TR09
TR11
2SB-434
b
42V
INF
BTL
IN
R
R43
470K
R16
R42 39K
R41 100K
R06 470K
R04 47K
C02 1/50
TR02
2SA495
R10 1K
C06 220/25
C26 220P
TR04
2SC734
D06
R26 470
TR08
2SA661
R28 10
R32 0.5(1)
TR12
2SB-434
C22 0.047
C24 0.047
C18 0.1
R36 10K
R02 47K
R08 33K
R12 120
R14 2.7K
C12 47/50
C20 1000P
D04
C04 10/35
F02
FUSE
1.6A
VR02
R20 3.3K
R18 3.3K
C08 220/25
R34 470
D02
C10
1000/35
TR06
2SC1166
R22 10
R24 470
R30 0.5(1)
TR10
2SD-234

TOP

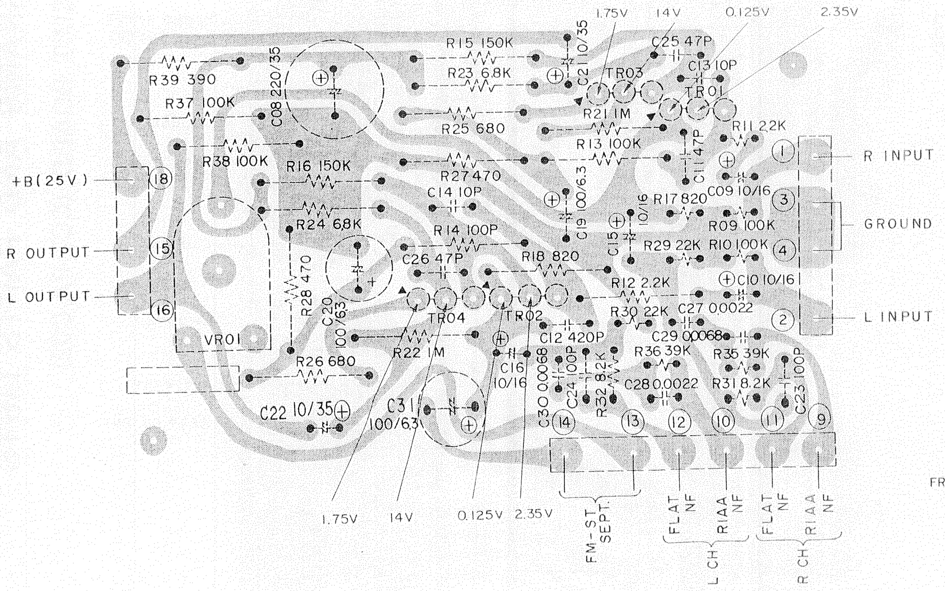

REAR OUTPUT
+B1 (42V)
GROUND
GROUND
REAR INPUT (BTL)
GROUND
BTL OUTPUT
FRONT INPUT
GROUND
+B1 (42V)
FRONT OUTPUT
14.7V
4.4V
22V
F02
FUSE
1.6 A
R16
R43
470K
C18 0.1
G
R
IN
BTL
INF
C22 0.047
C24 0.047
VR02
OUT
B
R20 3.3K
R18 3.3K
R36 10K
C08 220/25
C12 47/50
R02 47K
R08 33K
R12 120
R14 2.7K
R34 470
C04 10/35
D04
D02
C20 1000P
C10
1000/35
R42 39K
R41 100K
R06 470K
R04 47K
TR02
2SA495
C02 1/50
0.6V
20V
R10 1K
C06 220/25
D06
TR04
2SC734
C26 220P
21.5V
TR06
2SC1166
R22 10
R24 470
TR08
2SA661
R28 10
R26 470
R32 0.5(1)
R30 0.5(1)
2SD-234
TR10
2SB-434
TR12
b
42V
0V
20V
20.5V
TR13
2SC1000
C16 1/50
C15 1/50
R40 270
R05 6.8K
C14 35/25
R39 68K
R38 10K
R37 22K
OUT
C13 33/35
C21 0.047
C23 0.047
R33 470
C03 10/35
C01 1/50
C11 47/50
C17 0.1
R01 47K
R03 47K
R07 33K
R11 120K
R09 1K
R15 10(1/2)
D05
R13 2.7K
TR01
2SA495
C05 220/25
TR03
2SC734
C19 1000P
C25 220P
R27 10
C07 220/25
TR07
2SA661
R25 470
R31 0.5(1)
C09
1000/35
21.5V
20.5V
2SB-434
TR11
2SD-234
TR09
F01
FUSE
1.6A
TR05
2SC1166
R21 10
VR01
D01
D03
R19 3.3K
R17 3.3K
R33 10K
R23 470
R29 0.5(1)

BOTTOM

11-2 EQUALIZER CIRCUIT BOARD (CCT-AF-C08)

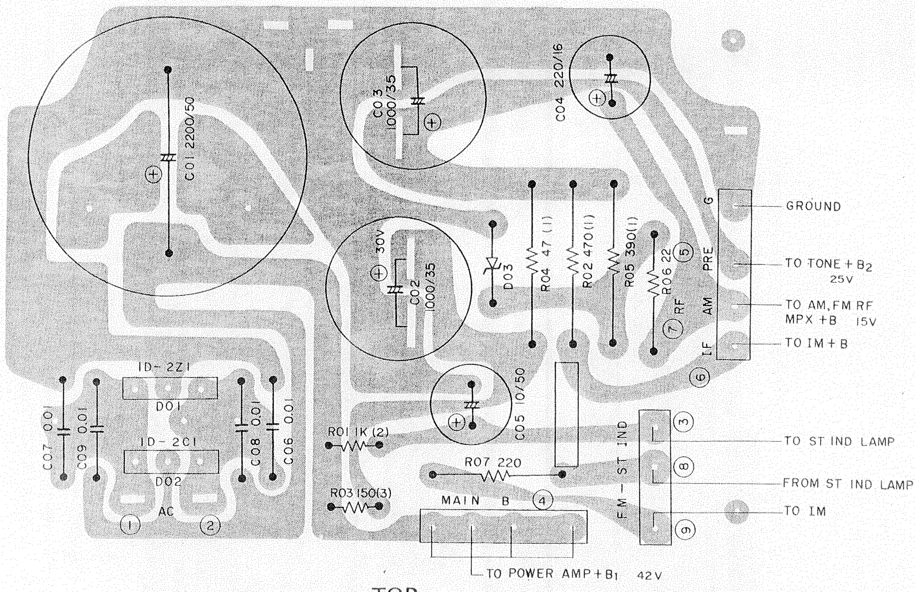

R INPUT
GROUND
L INPUT
+B(25V)
R OUTPUT
L OUTPUT
R CH
L CH
RIAA NF
FLAT NF
FM-ST SEPT.
C25 47P
C13 10P
TR01
TR03
C21 10/35
R15 150K
R23 6.8K
R21 1M
R25 680
R11 22K
R13 100K
C11 47P
R27 470
C08 220/35
R39 390
R37 100K
R38 100K
R16 150K
R24 68K
C09 10/16
R17 820
R09 100K
R10 100K
R29 22K
C15 10/16
C19 100/6.3
C14 10P
R14 100K
C26 47P
R18 820
C10 10/16
R12 2.2K
R30 22K
C27 0.0022
C29 0.068
TR02
TR04
C12 470P
R22 1M
C20 100/63
R28 470
VR01
R26 680
R35 39K
R36 39K
R32 8.2K
C24 100P
C30 0.0068
C16 10/16
C31 100/63
C22 10/35
C23 100P
R31 8.2K
C28 0.0022
2.35V
0.125V
14V
1.75V

TOP

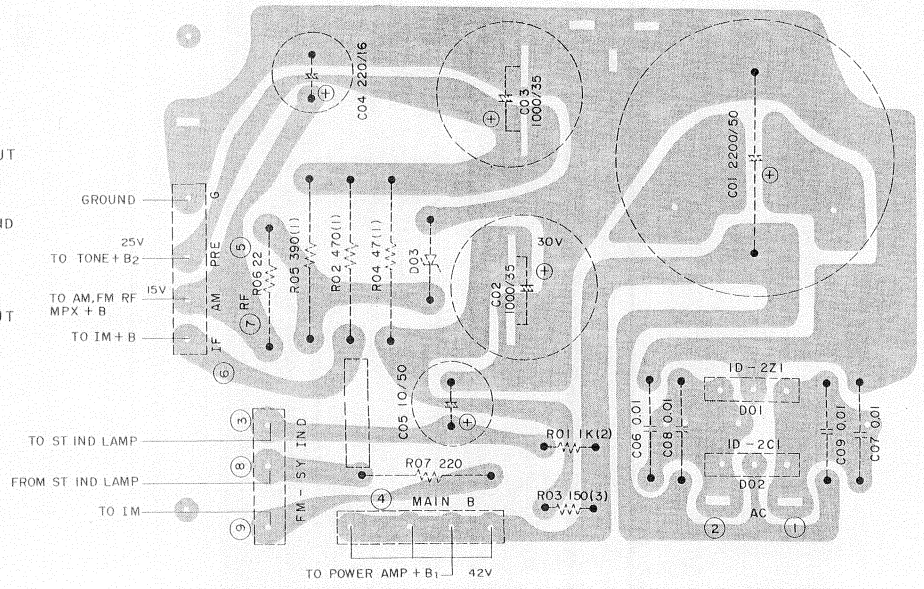

1.75V
14V
0.125V
2.35V
R15 150K
C25 47P
C21 10/35
TR03
C13 10P
TR01
R39 390
C08 220/35
R23 6.8K
R37 100K
R21 1M
R25 680
R11 22K
R13 100K
R38 100K
R16 150K
R27 470
C11 47P
C14 10P
C19 100/6.3
R17 820
C09 10/16
R24 68K
C15 10/16
R09 100K
R29 22K
R10 100K
R14 100P
C26 47P
R18 820
C10 10/16
R28 470
C20 100/63
TR04
TR02
R12 2.2K
R30 22K
C27 0.0022
VR01
R22 1M
C12 420P
C29 0.0068
R26 680
C16 10/16
R36 39K
R35 39K
C30 0.0068
C24 100P
R32 8.2K
C28 0.0022
R31 8.2K
C23 100P
C22 10/35
C31 100/63
+B(25V)
R OUTPUT
L OUTPUT
R INPUT
GROUND
L INPUT
FM-ST SEPT.
FLAT NF
RIAA NF
L CH
R CH

BOTTOM

11-3 POWER SUPPLY CIRCUIT BOARD (CCT-SPLY-C05)

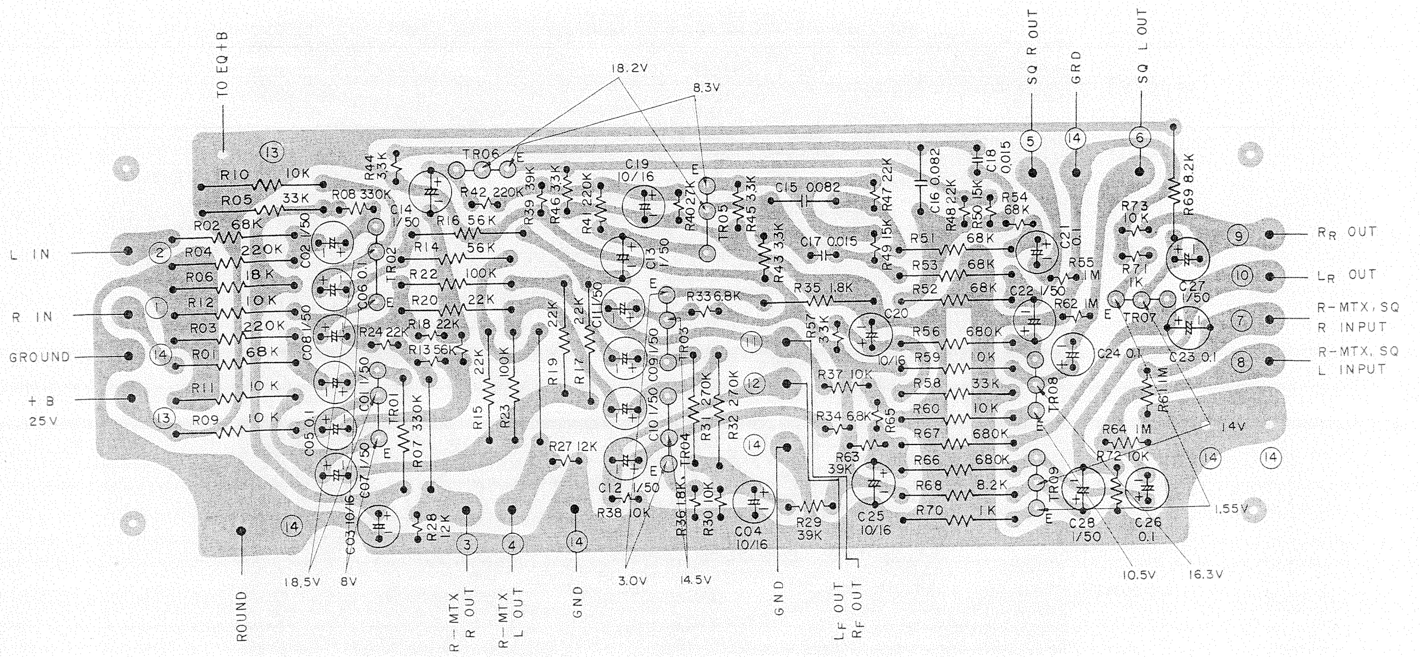

C01 2200/50
C03 1000/35
C04 220/16
C02 1000/35
30V
D03
R04 47 (1)
R02 470(1)
R05 390(1)
R06 22
RF
AM
PRE
G
IF
GROUND
TO TONE+B2 25V
TO AM,FM RF MPX+B 15V
TO IM+B
ID-2Z1
D01
ID-2C1
D02
C07 0.01
C09 0.01
C08 0.01
C06 0.01
AC
R01 1K (2)
R03 150(3)
C05 10/50
R07 220
MAIN B
FM-ST IND
TO ST IND LAMP
FROM ST IND LAMP
TO IM
TO POWER AMP+B1 42V

TOP

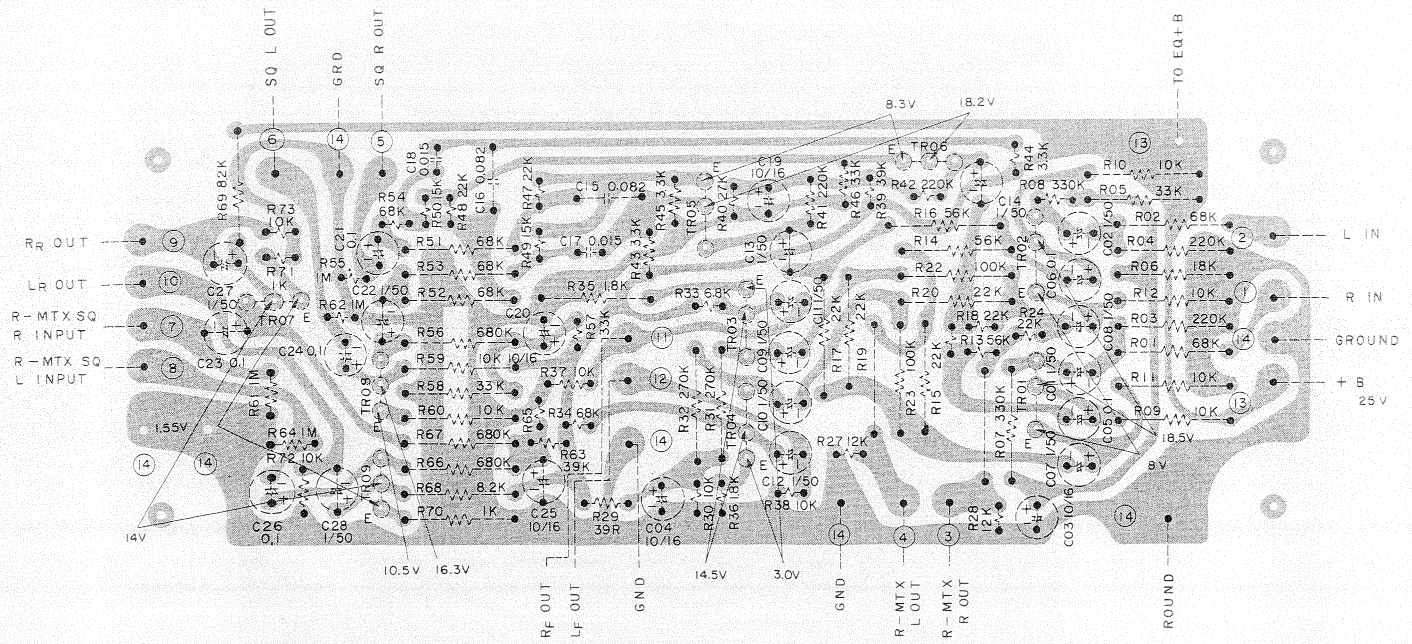

GROUND
25V
TO TONE+B2
15V
TO AM,FM RF MPX+B
TO IM+B
G
PRE
AM
IF
RF
R06 22
R05 390(1)
R02 470(1)
R04 47(1)
D03
C04 220/16
C03 1000/35
C02 1000/35
30V
C01 2200/50
C05 10/50
R01 1K(2)
R07 220
R03 150(3)
MAIN B
FM-SY IND
TO ST IND LAMP
FROM ST IND LAMP
TO IM
TO POWER AMP+B1 42V
ID-2Z1
D01
ID-2C1
D02
C06 0.01
C08 0.01
C09 0.01
C07 0.01
AC

BOTTOM

11-4 R-MTX & SQ CIRCUIT BOARD (CCT-AF-C10)

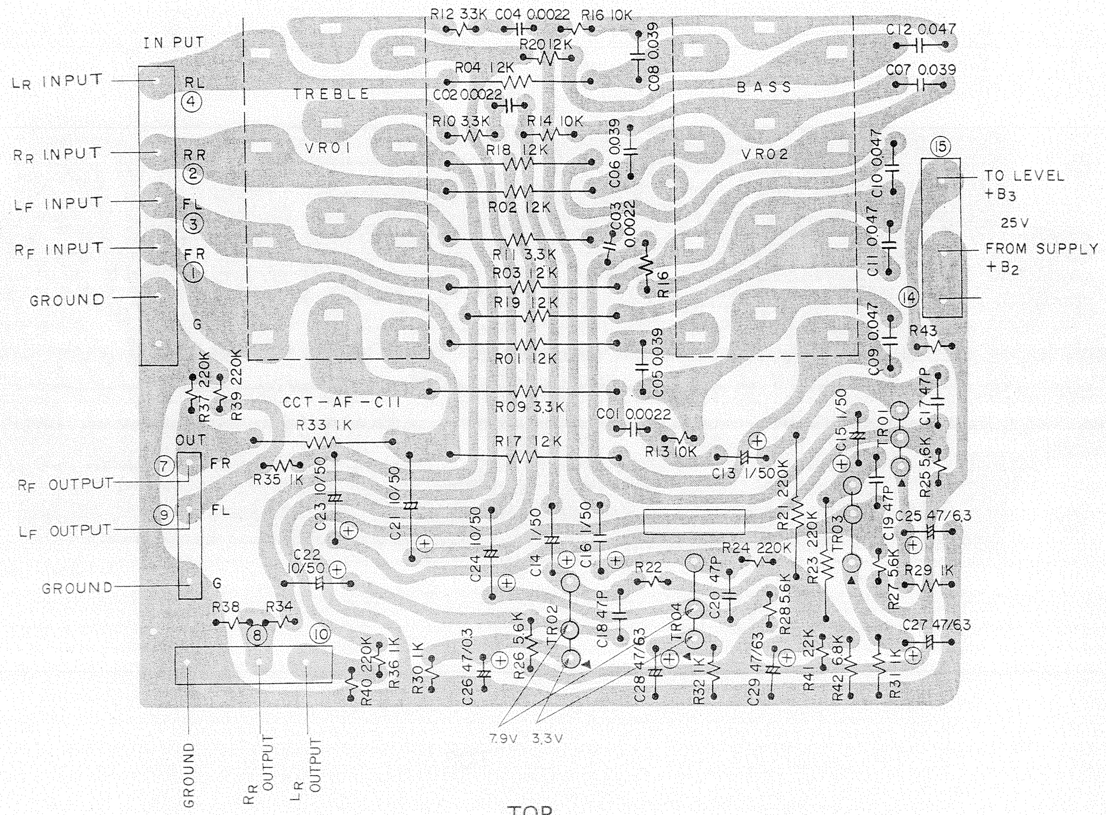

TO EQ+B
18.2V
8.3V
SQ R OUT
GRD
SQ L OUT
L IN
R IN
GROUND
+B
25V
RR OUT
LR OUT
R-MTX, SQ
R INPUT
R-MTX, SQ
L INPUT
14V
1.55V
18.5V
8V
ROUND
R-MTX
R OUT
R-MTX
L OUT
GND
3.0V
14.5V
GND
LF OUT
RF OUT
10.5V
16.3V

TOP

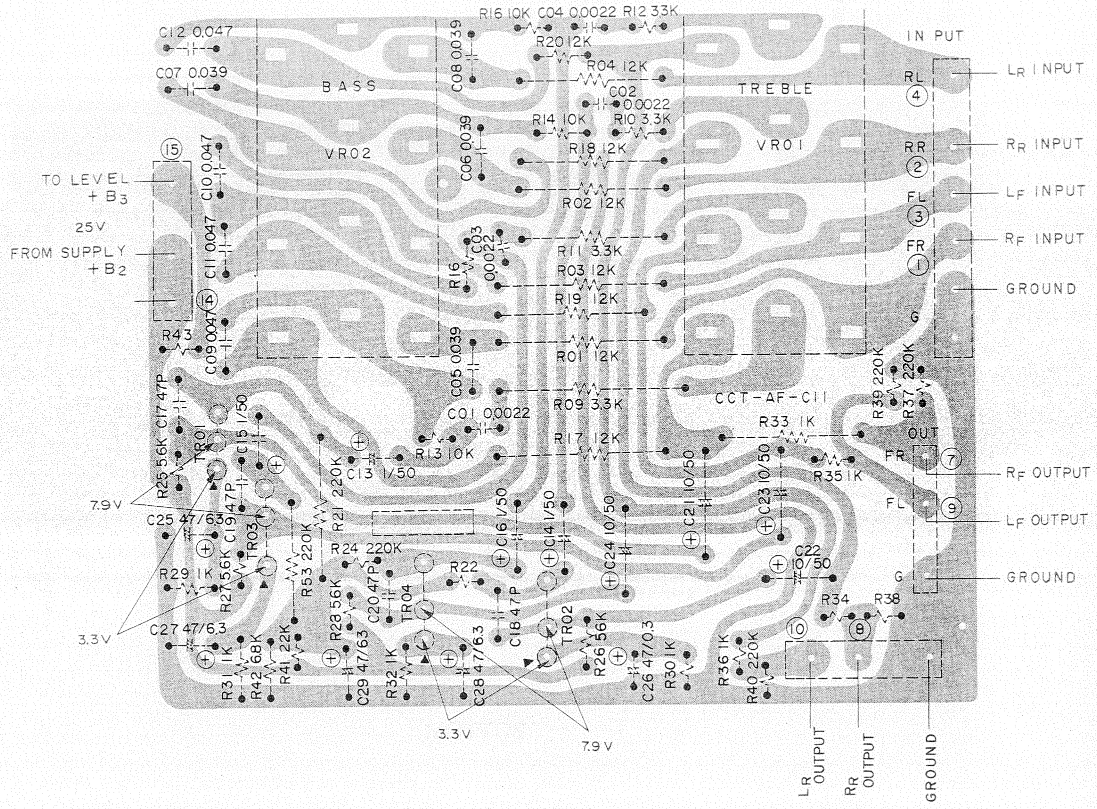

SQ L OUT
GRD
SQ R OUT
TO EQ+B
8.3V
18.2V
RR OUT
LR OUT
R-MTX SQ
R INPUT
R-MTX SQ
L INPUT
1.55V
14V
L IN
R IN
GROUND
+B
25V
18.5V
8V
10.5V
16.3V
RF OUT
LF OUT
GND
14.5V
3.0V
GND
R-MTX
L OUT
R-MTX
R OUT
ROUND

BOTTOM

11-5 TONE AMP CIRCUIT BOARD (CCT-AF-C11)

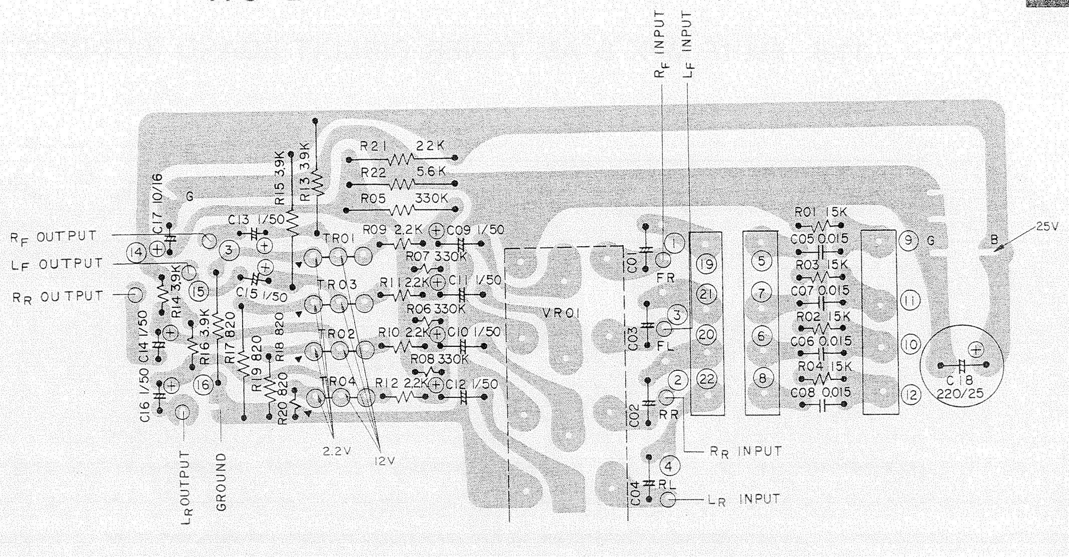

IN PUT
LR INPUT
RR INPUT
LF INPUT
RF INPUT
GROUND
RL ④
RR ②
FL ③
FR ①
G
TREBLE
VR01
BASS
VR02
R12 33K C04 0.0022 R16 10K
R20 12K
C08 0.039
R04 12K
C02 0.0022
R10 3.3K R14 10K
C06 0.039
R18 12K
R02 12K
C03 0.0022
R11 3.3K
R03 12K
R16
R19 12K
R01 12K
C05 0.039
R09 3.3K
C01 0.0022
R13 10K
R17 12K
C12 0.047
C07 0.039
C10 0.047
C11 0.047
C09 0.047
⑮
TO LEVEL +B3
25V
FROM SUPPLY +B2
⑭
R43
C17 47P
C15 1/50
TR01
R25 5.6K
C19 47P
C25 47/63
R21 220K
R23 220K
TR03
R27 5.6K
R29 1K
C27 47/63
C13 1/50
R37 220K
R39 220K
CCT-AF-C11
R33 1K
OUT
FR ⑦
FL ⑨
G
RF OUTPUT
LF OUTPUT
GROUND
R35 1K
C23 10/50
C21 10/50
C22 10/50
C24 10/50
C14 1/50
C16 1/50
R22
R24 220K
C20 47P
R28 5.6K
C18 47P
TR02
TR04
R26 5.6K
R38 R34
⑧ ⑩
R40 220K
R36 1K
R30 1K
C26 47/0.3
C28 47/63
R32 1K
C29 47/63
R41 22K
R42 6.8K
R31 1K
7.9V 3.3V
GROUND
RR OUTPUT
LR OUTPUT

TOP

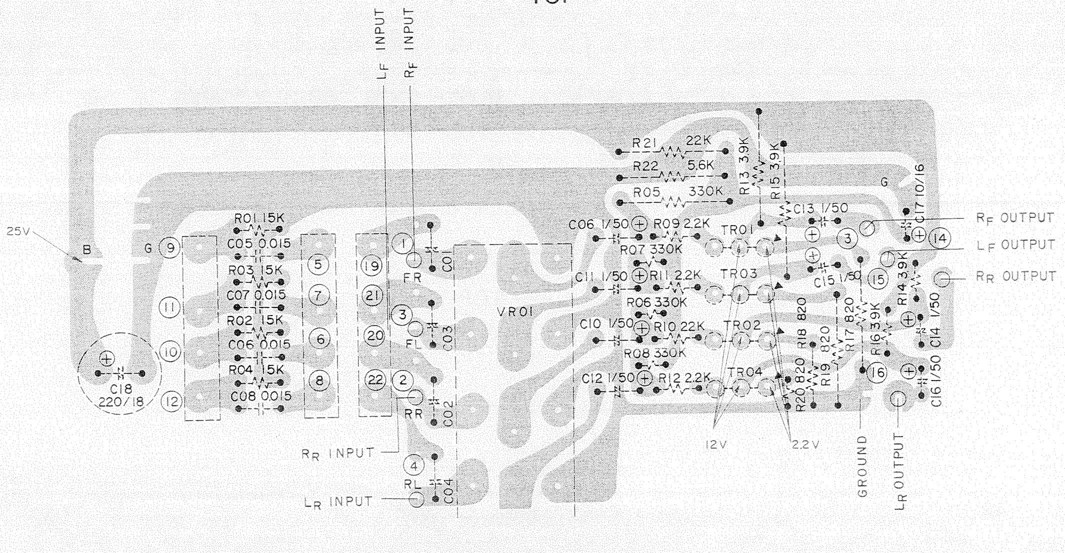

R16 10K C04 0.0022 R12 33K
R20 12K
C12 0.047
C07 0.039
C08 0.039
R04 12K
C02 0.0022
BASS
TREBLE
VR02
VR01
C06 0.039
R14 10K R10 3.3K
R18 12K
R02 12K
⑮
TO LEVEL +B3
25V
FROM SUPPLY +B2
⑭
C10 0.047
C11 0.047
C09 0.047
R43
R16
C03 0.0022
R11 3.3K
R03 12K
R19 12K
R01 12K
C05 0.039
R09 3.3K
C01 0.0022
R13 10K
R17 12K
CCT-AF-C11
R33 1K
R35 1K
R39 220K
R37 220K
IN PUT
RL ④
RR ②
FL ③
FR ①
G
LR INPUT
RR INPUT
LF INPUT
RF INPUT
GROUND
OUT
FR ⑦
FL ⑨
RF OUTPUT
LF OUTPUT
GROUND
C17 47P
TR01
C15 1/50
R25 5.6K
C19 47P
C13 1/50
R21 220K
7.9V
C25 47/63
TR03
R27 5.6K
R53 220K
R24 220K
R29 1K
C27 47/6.3
3.3V
R28 5.6K
C20 47P
TR04
R22
C16 1/50
C14 1/50
C24 10/50
C21 10/50
C23 10/50
C22 10/50
R34 R38
⑩ ⑧
C18 47P
TR02
R26 5.6K
C26 47/0.3
R30 1K
R36 1K
R40 220K
R31 1K
R42 6.8K
R41 22K
C29 47/63
R32 1K
C28 47/6.3
3.3V
7.9V
LR OUTPUT
RR OUTPUT
GROUND

BOTTOM

11-6 LEVEL AMP CIRCUIT BOARD (CCT-AF-C12)

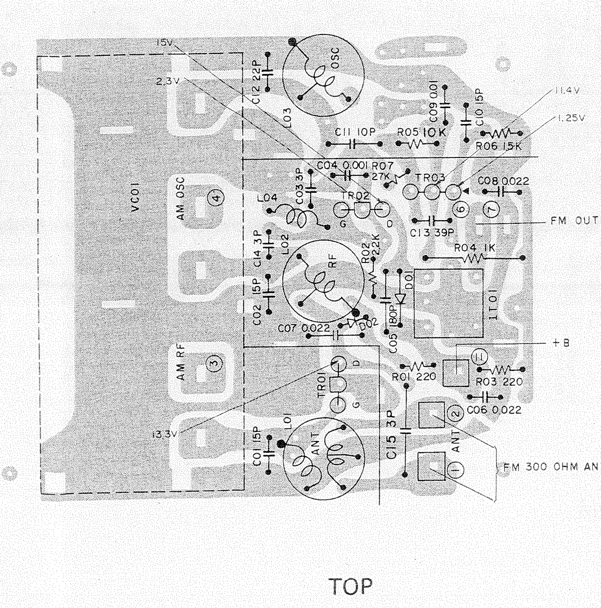

R_F INPUT
L_F INPUT
25V
B
G
R_F OUTPUT
L_F OUTPUT
R_R OUTPUT
L_R OUTPUT
GROUND
R_R INPUT
L_R INPUT
R21 22K
R22 5.6K
R05 330K
R15 3.9K
R13 3.9K
C17 10/16
C13 1/50
TR01
TR03
TR02
TR04
R09 2.2K
C09 1/50
R07 330K
R11 2.2K
C11 1/50
R06 330K
R10 2.2K
C10 1/50
R08 330K
R12 2.2K
C12 1/50
C15 1/50
R14 3.9K
R16 3.9K
R17 820
R18 820
R19 820
R20 820
C14 1/50
C16 1/50
2.2V
12V
VR01
C01
C02
C03
C04
FR
FL
RR
RL
R01 15K
C05 0.015
R03 15K
C07 0.015
R02 15K
C06 0.015
R04 15K
C08 0.015
C18 220/25

TOP

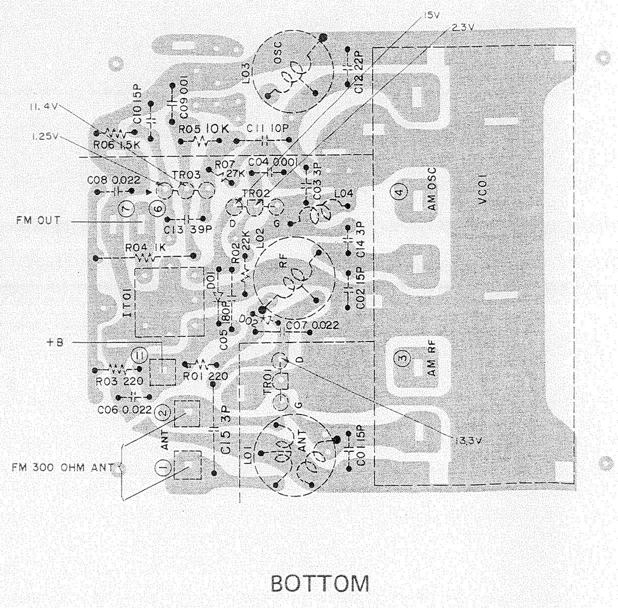

L_F INPUT
R_F INPUT
25V
B
G
R01 15K
C05 0.015
R03 15K
C07 0.015
R02 15K
C06 0.015
R04 15K
C08 0.015
C18 220/18
VR01
C01
C02
C03
C04
FR
FL
RR
RL
R_R INPUT
L_R INPUT
R21 22K
R22 5.6K
R05 330K
R13 3.9K
R15 3.9K
C17 10/16
C13 1/50
C06 1/50
R09 2.2K
TR01
R07 330K
C11 1/50
R11 2.2K
TR03
R06 330K
C10 1/50
R10 2.2K
TR02
R08 330K
C12 1/50
R12 2.2K
TR04
C15 1/50
R14 3.9K
R16 3.9K
R17 820
R18 820
R19 820
R20 820
C14 1/50
C16 1/50
12V
2.2V
GROUND
L_R OUTPUT
R_F OUTPUT
L_F OUTPUT
R_R OUTPUT

BOTTOM

11-7 FM FRONT END CIRCUIT BOARD (CCT-RF-C04)

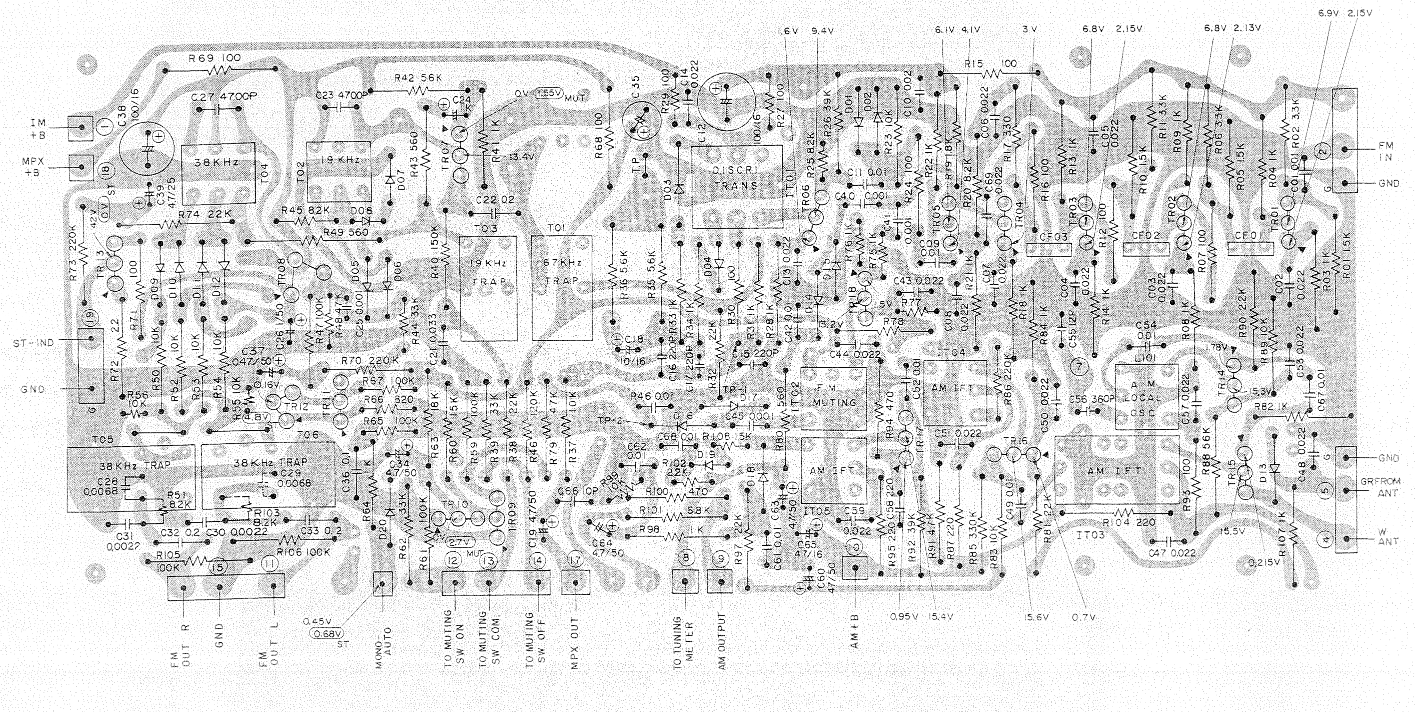

15V
2.3V
C12 22P
OSC
L03
C09 0.001
C10 15P
11.4V
1.25V
C11 10P
R05 10K
R06 1.5K
C04 0.001
R07 27K
TR03
C08 0.022
VC01
AM OSC
L04
C03 3P
TR02
FM OUT
C13 39P
C14 3P
L02
R04 1K
RF
R02 2.2K
D01
C02 15P
C07 0.022
C05 180P
IT01
+B
AM RF
TR01
R01 220
R03 220
C06 0.022
13.3V
L01
C01 15P
ANT
C15 3P
FM 300 OHM ANT

TOP

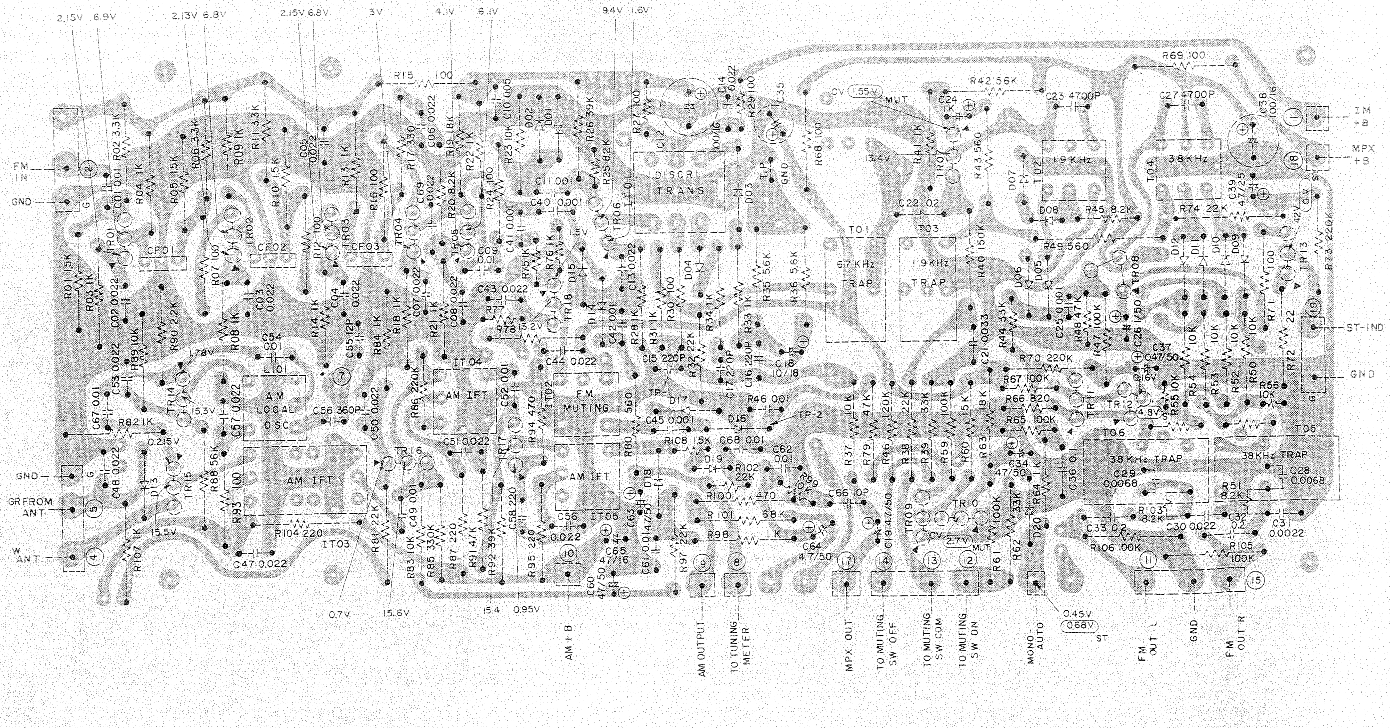

15V
2.3V
OSC
L03
C12 22P
C10 15P
C09 0.001
11.4V
1.25V
R05 10K
C11 10P
R06 1.5K
C08 0.022
TR03
R07 27K
C04 0.001
C03 3P
TR02
L04
FM OUT
C13 39P
VC01
AM OSC
R04 1K
R02 2.2K
L02
RF
D01
C14 3P
C02 15P
C05 180P
C07 0.022
IT01
+B
R03 220
R01 220
TR01
AM RF
C06 0.022
13.3V
ANT
C15 3P
L01
C01 15P
FM 300 OHM ANT

TOP BOTTOM

11-8 FM IF MPX & AM TUNER CIRCUIT BOARD (CCT-IM-C01)


IM +B
MPX +B
ST-IND
GND
FM OUT R
GND
FM OUT L
MONO-AUTO
TO MUTING SW ON
TO MUTING SW COM.
TO MUTING SW OFF
MPX OUT
TO TUNING METER
AM OUTPUT
AM+B
FM IN
GND
GND
GRFROM ANT
W ANT
DISCRI TRANS
19KHz TRAP
67KHz TRAP
38KHz TRAP
FM MUTING
AM IFT
AM LOCAL OSC
CF01
CF02
CF03
0.45V
0.68V
ST
1.55V
MUT
2.7V

TOP


FM IN
GND
GND
GRFROM ANT
W ANT
AM+B
AM OUTPUT
TO TUNING METER
MPX OUT
TO MUTING SW OFF
TO MUTING SW COM
TO MUTING SW ON
MONO-AUTO
FM OUT L
GND
FM OUT R
IM +B
MPX +B
ST-IND
GND
DISCRI TRANS
67KHz TRAP
19KHz TRAP
38KHz TRAP
FM MUTING
AM IFT
AM LOCAL OSC
0.45V
0.68V
ST

BOTTOM

PARTS LIST

POWER AMP UNIT (CCT-PA-C02)

RESISTORS

SYMBOL	PART NO.	DESCRIPTION
R01,02	22544473	47K ohm K 1/8W RD
R03,04	22544473	47K ohm K 1/8W RD
R05	22544682	6.8K ohm K 1/8W RD
R06	22544474	470K ohm K 1/8W RD
R07,08	22544333	33K ohm K 1/8W RD
R09,10	22544102	1K ohm K 1/8W RD
R11,12	22544121	120 ohm K 1/8W RD
R13,14	22544272	2.7K ohm K 1/8W RD
R15,16	22563100	10 ohm K 1/2W RC
R17,18	22544332	3.3K ohm K 1/8W RD
R19,20	22544332	3.3K ohm K 1/8W RD
R21,22	22544109	10 ohm K 1/8W RD
R23,24	22544471	470 ohm K 1/8W RD
R25,26	22544471	470 ohm K 1/8W RD
R27,28	22544109	10 ohm K 1/8W RD
R29,30	22570031	0.5 ohm K 1W RS
R31,32	22570031	0.5 ohm K 1W PS
R33,34	22544471	470 ohm K 1/8W RD
R35,36	22544103	10K ohm K 1/8W RD
R37	22544223	22K ohm K 1/8W RD
R38	22544103	10K ohm K 1/8W RD
R39	22544682	6.8K ohm K 1/8W RD
R40	22544274	270K ohm K 1/8W RD
R41	22544104	100K ohm K 1/8W RD
R42	22544393	39K ohm K 1/8W RD
R43	22544474	470K ohm K 1/8W RD

CAPACITORS

SYMBOL	PART NO.	DESCRIPTION
C01,02	22448109	1μF 50WV CE
C03,04	22447100	10μF 35WV CE
C05,06	22446221	220μF 25WV CE
C07,08	22446221	220μF 25WV CE
C09,10	22457102	1000μ35WV T CE
C11,12	22448470	47μF 50WV CE
C13	22447330	33μF 35WV CE
C14	22446330	33μF 25WV CE
C15	22448109	1μF 50WV CE
C16	22448109	1μF 50WV CE
C17,18	22373104	0.1μF 50V M MY
C19,20	22343102	1000pF 50V M CK
C21,22	22342473	0.047μF 50V Z CK
C23,24	22342473	0.047μF 50V Z CK
C25,26	22343221	220pF 50V M CK
VR01,02	22658189	500 ohm Ic idel adjust
TR01,02		2SA495-Y
TR03,04		2SC734-Y
TR05,06		2SC1166-Y
TR07,08		2SA661-Y
TR09,10		2SD234-O
TR11,12		2SB434-O
TR13		2SC1000-GR
D01 ~06		M8513A-O
F01,02	22144174	Fuse 1.6A Protector

EQUALIZER UNIT (CCT-AF-C08)

RESISTORS

SYMBOL	PART NO.	DESCRIPTION
R09,10	22544104	100K ohm K 1/8W RD
R11,12	22544222	2.2K ohm K 1/8W RD
R13,14	22544104	100K ohm K 1/8W RD
R15,16	22544154	150K ohm K 1/8W RD
R17,18	22544821	820 ohm K 1/8W RD
R19,20	—	—
R21,22	22544105	1M ohm K 1/8W RD
R23,24	22544682	6.8K ohm K 1/8W RD
R25,26	22544681	680 ohm K 1/8W RD
R27,28	22544471	470 ohm K 1/8W RD
R29,30	22544223	22K ohm K 1/8W RD
R31,32	22544822	8.2K ohm K 1/8W RD
R33,34	—	—
R35,36	22544393	39K ohm K 1/8W RD
R37,38	22544104	100K ohm K 1/8W RD
R39	22544391	390 ohm K 1/8W RD

CAPACITORS

SYMBOL	PART NO.	DESCRIPTION
C08	22447221	220μF 35WV CE
C09,10	22445100	10μF 16WV CE
C11,12	22343471	470pF 50V M CK
C13,14	22362100	10pF 50V K CC(SL)
C15,16	22445100	10μF 16WV CE
C17,18		
C19,20	22442101	100μF 6.3WV CE
C21,22	22447100	10μF 35WV CE
C23,24	22362101	100pF 50V K CC(SL)
C25,26	22362470	47pF 50V K CC(SL)
C27,28	22373222	0.0022μF 50V M MY
C29, 30	22373682	0.0068μF 50V M MY
C31	22442101	100μF 6.3WV CE
VR01	22658179	5K ohm FM ST separation control
TR01,02		2SC 1000 GR
TR03,04		2SC 1000 GR

POWER SUPPLY UNIT (CCT-SPLY-C05)

RESISTORS

SYMBOL	PART NO.	DESCRIPTION
R01	22570024	1K ohm K 2W RS
R02	22570035	470 ohm K 1W RS
R03	22570019	150 ohm K 3W RS
R04	22570034	47 ohm K 1W RS
R05	22570033	390 ohm K 1W RS
R06	22563220	22 ohm K 1/2W RC
R07	22563221	220 ohm K 1/2W RC

CAPACITORS

SYMBOL	PART NO.	DESCRIPTION
C01	22430028	2200μF 50WV CE
C02	22430015	1000μF 35WV CE
C03	22430015	1000μF 35WV CE
C04	22445221	220μF 16WV CE
C05	22448100	10μF 50WV CE
C06 ~09	22340030	0.01μF 500V P CK
C10	22310020	0.047μF 200V M CQ
D01		1D-2Z1
D02		1D-2C1
D03		02Z15A Zener 15V

R-MTX & SQ UNIT (CCT-AF-C10)

RESISTORS

SYMBOL	PART NO.	DESCRIPTION
R01,02	22544683	68K ohm K 1/8W RD
R03,04	22544224	220K ohm K 1/8W RD

SYMBOL	PART NO.	DESCRIPTION
R05	22544333	33K ohm K 1/8W RD
R06	22544183	18K ohm K 1/8W RD
R07,08	22544334	330K ohm K 1/8W RD
R09,10	22544103	10K ohm K 1/8W RD
R11,12	22544103	10K ohm K 1/8W RD
R13,14	22544563	56K ohm K 1/8W RD
R15,16	22544563	56K ohm K 1/8W RD
R17,18	22544223	22K ohm K 1/8W RD
R19,20	22544223	22K ohm K 1/8W RD
R21,22	22544104	100K ohm K 1/8W RD
R23,24	22544223	22K ohm K 1/8W RD
R25,26	—	—
R27,28	22544123	12K ohm K 1/8W RD
R29	22544393	39K ohm K 1/8W RD
R30	22544103	10K ohm K 1/8W RD
R31,32	22544274	270K ohm K 1/8W RD
R33,34	22544682	6.8K ohm K 1/8W RD
R35,36	22544182	1.8K ohm K 1/8W RD
R37,38	22544103	10K ohm K 1/8W RD
R39	22544393	39K ohm K 1/8W RD
R40	22544273	27K ohm K 1/8W RD
R41,42	22544224	220K ohm K 1/8W RD
R43,44	22544332	3.3K ohm K 1/8W RD
R45,46	22544332	3.3K ohm K 1/8W RD
R47,48	22544223	22K ohm K 1/8W RD
R49,50	22544153	15K ohm K 1/8W RD
R51,52	22544683	68K ohm K 1/8W RD
R53,54	22544683	68K ohm K 1/8W RD
R55	22544105	1M ohm K 1/8W RD
R56	22544684	680K ohm K 1/8W RD
R57	22544333	33K ohm K 1/8W RD
R58	22544333	33K ohm K 1/8W RD
R59	22544103	10K ohm K 1/8W RD
R60	22544103	10K ohm K 1/8W RD
R61	22544105	1M ohm K 1/8W RD
R62	22544105	1M ohm K 1/8W RD
R63	22544393	39K ohm K 1/8W RD
R64	22544105	1M ohm K 1/8W RD
R65	22544123	12K ohm K 1/8W RD
R66	22544684	680K ohm K 1/8W RD
R67	22544684	680K ohm K 1/8W RD
R68,69	22544822	8.2K ohm K 1/8W RD
R70,71	22544102	1K ohm K 1/8W RD
R72,73	22544103	10K ohm K 1/8W RD

CAPACITORS

SYMBOL	PART NO.	DESCRIPTION
C01,02	22448109	1μF 50WV CE
C03	22445100	10μF 16WV CE
C04	22445100	10μF 16WV CE
C05,06	22373104	0.1μF 50V M MY
C07,08,09, C10,11,12, C13,14	22448109	1μF 50WV CE
C15,16	22373823	0.082μF 50V M MY
C17,18	22373153	0.015μF 50V M MY
C19,20	22445100	10μF 16WV CE
C21	22373104	0.1μF 50V M MY
C22	22448109	1μF 50WV CE
C23	22373104	0.1μF 50V M MY
C24	22373104	0.1μF 50V M MY
C25	22445100	10μF 16WV CE
C26	22373104	0.1μF 50V M MY
C27	22448109	1μF 50WV CE
C28	22448109	1μF 50WV CE

SYMBOL	PART NO.	DESCRIPTION
TR01,02		2SC1000-GR
TR03,04		2SC1000-GR
TR05,06		2SC1000-GR
TR07,09		2SC1000-GR
TR08		2SC1000-GR

TONE AMP UNIT (CCT-AF-C11)

RESISTORS

SYMBOL	PART NO.	DESCRIPTION
R01 ~ 04	22544123	12K ohm K 1/8W RD
R05 ~ 08	—	—
R09 ~ 12	22544332	3.3K ohm K 1/8W RD
R13 ~ 16	22544103	10K ohm K 1/8W RD
R17 ~ 20	22544123	12K ohm K 1/8W RD
R21 ~ 24	22544224	220K ohm K 1/8W RD
R25 ~ 28	22544562	5.6K ohm K 1/8W RD
R29 ~ 32	22544102	1K ohm K 1/8W RD
R33 ~ 36	22544102	1K ohm K 1/8W RD
R37 ~ 40	22544224	220K ohm K 1/8W RD
R41	22544223	22K ohm K 1/8W RD
R42	22544682	6.8K ohm K 1/8W RD
R43	22544101	100 ohm K 1/8W RD

CAPACITORS

SYMBOL	PART NO.	DESCRIPTION
C01 ~ 04	22373222	0.0022μF 50V M MY
C05 ~ 08	22373393	0.039μF 50V M MY
C09 ~ 12	22373473	0.047μF 50V M MY
C13 ~ 16	22448109	1μF 50WV CE
C17 ~ 20	22362470	47pF 50V K CC(SL)
C21 ~ 24	22448100	10μF 50WV CE
C25 ~ 28	22442470	47μF 6.3WV CE
C29	22442470	47μF 6.3WV CE
VR01,02	22650411	100K ohm (B) TONE
TR01 ~ 04		2SC1000-GR

LEVEL AMP UNIT (CCT-AF-C12)

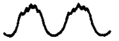
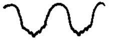
RESISTORS

SYMBOL	PART NO.	DESCRIPTION
R01 ~ 04	22544153	15K ohm K 1/8W RD
R05 ~ 08	22544334	330K ohm K 1/8W RD
R09 ~ 12	22544222	2.2K ohm K 1/8W RD
R13 ~ 16	22544392	3.9K ohm K 1/8W RD
R17 ~ 20	22544821	820 ohm K 1/8W RD
R21	22544223	22K ohm K 1/8W RD
R22	22544562	5.6K ohm K 1/8W RD

CAPACITORS

SYMBOL	PART NO.	DESCRIPTION
C01 ~ 04	22362181	180pF 50V K CC(SL)
C05 ~ 08	22373153	0.015μF 50V M MY
C09 ~ 12	22448109	1μF 50WV CE
C13 ~ 16	22448109	1μF 50WV CE
C17	22445100	10μF 16WV CE
C18	22446221	220μF 25WV CE
VR01	22650415	250K ohm (B) VOLUME
TR01 ~ 04		2SC1000-BL

FM DISTORTION ADJUSTMENT

1. Set the SG at 98 MHz (400 Hz 100% modulation), output 60 dB.
2. Connect it to the antenna terminal of the set and tune in 98 MHz signal.
3. Increase and decrease the SG frequency for output waveforms, upper clip  and lower clip , respectively, and measure the SG frequencies (f_1 and f_2) obtained.
   Set the SG at the frequency $\frac{f_1 + f_2}{2}$.
4. Adjust the discrete transformer IT01 upper and lower cores of Unit PCB CCT-IM-C01 to obtain the minimum distortion value.

FM MUTING ADJUSTMENT

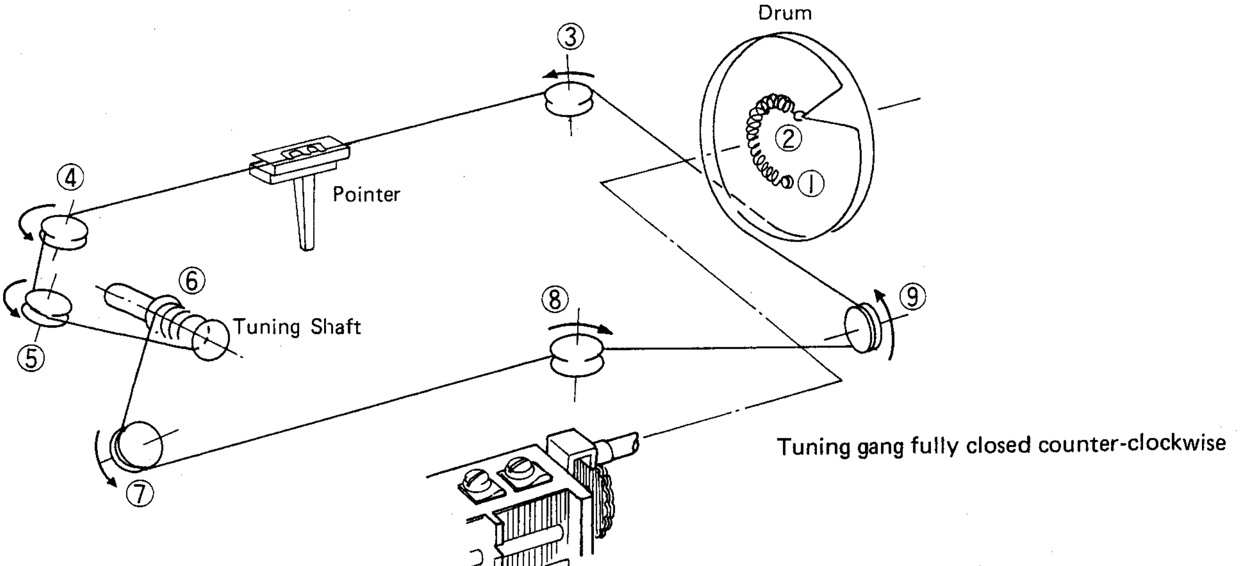
1. Set the SG at 98 MHz, output 60 dB.
2. Connect it to the antenna terminal of the set and tune in 98 MHz.
3. Adjust IT02 of Unit PCB CCT IM-C01 so that the maximum DC voltage can be obtained at TP2.

FM-ST DISTORTION ADJUSTMENT

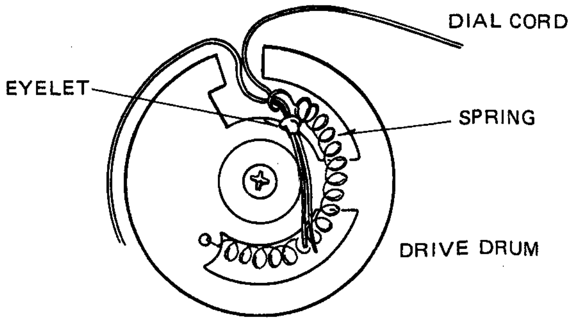
AFTER FM DISTORTION ADJUSTMENT

STEP	GENERATOR	REMARKS
1	For adjustment set-up, see Fig. 10.	
2	Connect VTVM to REC OUT.	
3	FM SG 98MHz INPUT 60dB 19KHz 10% modulation (L+R) +19KHz 30% modulation L=R = 400Hz or 1KHz	
4	Set right Channel to zero.	Adjust T04 (38KHz Transformer) slightly to obtain minimum distortion.
5	Repeat Separation Control Step 4.	Adjust VR01 (AF-C08) to obtain good separation.

6. DIAL STRINGING DIAGRAM

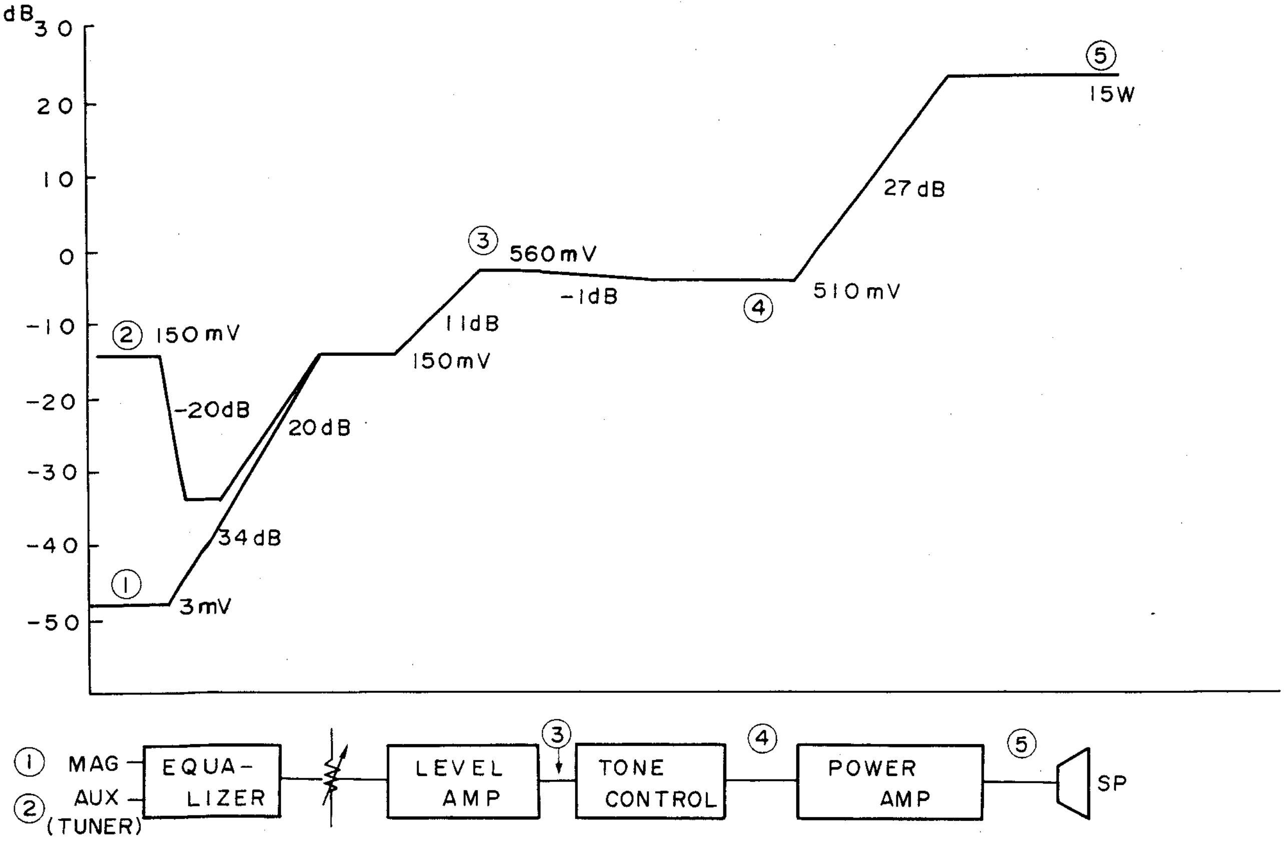


Dial Stringing Block Diagram

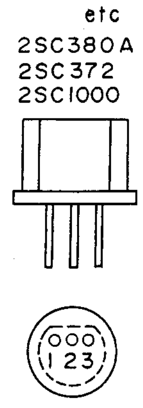


Load the dial cord as shown in the figure above. Get the cord through the eyelet as shown right.
Give tension on the dial cord by tension-spring action. Then squash the eyelet and fix it by the aid of a small amount of cement not to loosen the cord.

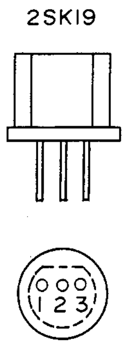
7. LEVEL DIAGRAM



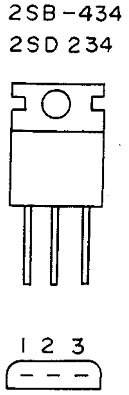
8. TRANSISTOR BASE DIAGRAMS


etc
2SC380A
2SC372
2SC1000
1 2 3

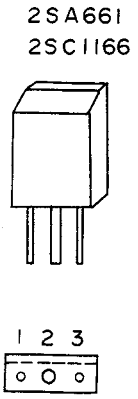
1. Emitter
2. Collector
3. Base



1. Drain
2. Source
3. Gate


2SB-434
2SD 234
1 2 3

1. Base
2. Collector(Radiation Board)
3. Emitter


2SA661
2SC1166
1 2 3

1. Emitter
2. Collector
3. Base

FM FRONT END UNIT (CCT-RF-C04)

RESISTORS

SYMBOL	PART NO.	DESCRIPTION
R01	22544221	220 ohm K 1/8W RD
R02	22544222	2.2K ohm K 1/8W RD
R03	22544221	220 ohm K 1/8W RD
R04	22544102	1K ohm K 1/8W RD
R05	22544103	10K ohm K 1/8W RD
R06	22544152	1.5K ohm K 1/8W RD
R07	22544272	2.7K ohm K 1/8W RD

CAPACITORS

SYMBOL	PART NO.	DESCRIPTION
C01	22360145	15pF 50V J CC(RH)
C02	22360145	15pF 50V J CC(RH)
C03	22361209	2pF 50V J CC(SL)
C04	22341102	0.001μF 50V P CK
C05	22360242	180pF 50V K CC(RH)
C06,07,08	22342223	0.022μ F 50V Z CK
C09	22342103	0.01μ F 50V Z CK
C10	22360132	15pF 50V J CC(CH)
C11	22360131	10pF 50V J CC(CH)
C12	22360141	22pF 50V J CC(PH)
C13	22360137	39pF 50V J CC(CH)
C14,15	22361309	3pF 50V J CC(SL)

SYMBOL	PART NO.	DESCRIPTION
TR01		2SK19-GR
TR02		2SK19-GR
TR03		2SC785-O
D01		IS1555
D02		IS1555
L01	22292037	ANT coil COIL-RT81T
L02	22292043	RF coil COIL-RT81T
L03	22295016	Local Osc Coil COIL-RT8057
L04	22211144	Choke Coil 1μH COIL-LH10S
IT01	22265655	FM IFT IFT-IT6478
VC01	22307353	Variable Capacitor

FM IF MPX & AM TUNER UNIT (CCT-IM-C01)

RESISTORS

SYMBOL	PART NO.	DESCRIPTION
R01	22544152	1.5K ohm K 1/8W RD
R02	22544332	3.3K ohm K 1/8W RD
R03	22544102	1K ohm K 1/8W RD
R04	22544102	1K ohm K 1/8W RD
R05	22544152	1.5K ohm K 1/8W RD
R06	22544332	3.3K ohm K 1/8W RD
R07	22544331	330 ohm K 1/8W RD
R08	22544102	1K ohm K 1/8W RD
R09	22544102	1K ohm K 1/8W RD
R10	22544152	1.5K ohm K 1/8W RD
R11	22544332	3.3K ohm K 1/8W RD
R12	22544101	100 ohm K 1/8W RD
R13	22544102	1K ohm K 1/8W RD
R14	22544102	1K ohm K 1/8W RD
R15	22544101	100 ohm K 1/8W RD
R16	22544101	100 ohm K 1/8W RD
R17	22544331	330 ohm K 1/8W RD
R18	22544102	1K ohm K 1/8W RD
R19	22544182	1.8K ohm K 1/8W RD
R20	22544822	8.2K ohm K 1/8W RD
R21	22544102	1K ohm K 1/8W RD
R22	22544102	1K ohm K 1/8W RD
R23	22544104	100K ohm K 1/8W RD
R24	22544101	100 ohm K 1/8W RD
R25	22544822	8.2K ohm K 1/8W RD
R26	22544393	39K ohm K 1/8W RD
R27	22544101	100 ohm K 1/8W RD
R28	22544102	1K ohm K 1/8W RD
R29	22544101	100 ohm K 1/8W RD
R30	22544101	100 ohm K 1/8W RD
R31	22544102	1K ohm K 1/8W RD
R32	22544223	22K ohm K 1/8W RD
R33	22544102	1K ohm K 1/8W RD
R34	22544102	1K ohm K 1/8W RD
R35	22544562	5.6K ohm K 1/8W RD
R36	22544562	5.6K ohm K 1/8W RD
R37	22544103	10K ohm K 1/8W RD
R38	22544223	22K ohm K 1/8W RD
R39	22544333	33K ohm K 1/8W RD
R40	22544154	150K ohm K 1/8W RD
R41	22544102	1K ohm K 1/8W RD
R42	22544563	56K ohm K 1/8W RD
R43	22544561	560 ohm K 1/8W RD
R44	22544333	33K ohm K 1/8W RD
R45	22544822	8.2K ohm K 1/8W RD
R46	22544124	120K ohm K 1/8W RD
R47	22544104	100K ohm K 1/8W RD
R48	22544473	47K ohm K 1/8W RD
R49	22544561	560 ohm K 1/8W RD
R50	22544103	10K ohm K 1/8W RD
R51	22544822	8.2K ohm K 1/8W RD
R52 ~ 54	22544103	10K ohm K 1/8W RD
R55,56	22544103	10K ohm K 1/8W RD
R59	22544104	100K ohm K 1/8W RD
R60	22544153	15K ohm K 1/8W RD
R61	22544104	100K ohm K 1/8W RD
R62	22544333	33K ohm K 1/8W RD
R63	22544183	18K ohm K 1/8W RD
R64	22544102	1K ohm K 1/8W RD
R65	22544104	100K ohm K 1/8W RD
R66	22544821	820 ohm K 1/8W RD
R67	22544104	100K ohm K 1/8W RD
R68	22544101	100 ohm K 1/8W RD
R69	22544101	100 ohm K 1/8W RD
R70	22544224	220K ohm K 1/8W RD
R71	22544101	100 ohm K 1/8W RD
R72	22544229	2.2 ohm K 1/8W RD
R73	22544224	220K ohm K 1/8W RD
R74	22544223	22K ohm K 1/8W RD
R75	22544102	1K ohm K 1/8W RD
R76	22544102	1K ohm K 1/8W RD
R77	22544822	8.2K ohm K 1/8W RD
R78	22544393	39K ohm K 1/8W RD
R79	22544473	47K ohm K 1/8W RD
R80	22544561	560 ohm K 1/8W RD
R81	22544223	22K ohm K 1/8W RD
R82	22544102	1K ohm K 1/8W RD
R83	22544103	10K ohm K 1/8W RD
R84	22544102	1K ohm K 1/8W RD
R85	22544334	330K ohm K 1/8W RD
R86	22544224	220K ohm K 1/8W RD
R87	22544221	220 ohm K 1/8W RD
R88	22544563	56K ohm K 1/8W RD
R89	22544103	10K ohm K 1/8W RD
R90	22544222	2.2K ohm K 1/8W RD
R91	22544472	4.7K ohm K 1/8W RD
R92	22544393	39K ohm K 1/8W RD
R93	22544101	100 ohm K 1/8W RD

SYMBOL	PART NO.	DESCRIPTION
R94	22544471	470 ohm K 1/8W RD
R95	22544221	220 ohm K 1/8W RD
R96	22544223	22K ohm K 1/8W RD
R97	22544223	22K ohm K 1/8W RD
R98	22544102	1K ohm K 1/8W RD
R99	22544103	10K ohm K 1/8W RD
R100	22544222	2.2K ohm K 1/8W RD
R101	22544682	6.8K ohm K 1/8W RD
R102	22544471	470 ohm K 1/8W RD
R103	22544822	8.2K ohm K 1/8W RD
R104	22544221	220 ohm K 1/8W RD
R105,106	22544104	100K ohm K 1/8W RD
R107	22544102	1K ohm K 1/8W RD
R108	22544152	1.5K ohm K 1/8W RD
	CAPACITORS	
C01	22342103	0.01μF 50V Z CK
C02	22342223	0.022μF 50V Z CK
C03,04,05, C06,07,08	22342223	0.022μF 50V Z CK
C09	22342103	0.01μF 50V Z CK
C10	22342223	0.022μF 50V Z CK
C11	22342103	0.01μF 50V Z CK
C12	22445101	100μF 16WV CE
C13	22342223	0.022μF 50V Z CK
C14	22342223	0.022μF 50V Z CK
C15	22342221	220pF 50V M CK
C16,17	22343221	220pF 50V M CK
C18	22445100	10μF 16WV CE
C19	22448479	4.7μF 50WV CE
C20		
C21	22373333	0.033μF 50V M MY
C22	22340001	0.2μF 12V Z Ceracon
C23	22382472	4700pF 50V K PS
C24	22448479	4.7μF 50WV CE
C25	22373102	0.001μF 50V M MY
C26	22448109	1μF 50WV CE
C27	22382472	4700pF 50V K PS
C28,29	22371682	0.0068μF 50V J MY
C31,31	22371222	0.0022μF 50V J MY
C32,33	22340001	0.2μF 12V Z Cera Con
C34	22448479	4.7μF 50WV CE
C35	22448479	4.7μF 50WV CE
C36	22340002	0.1μF 12V Z Cera Con
C37	22448478	0.47μF 50WV CE
C38	22445101	100μF 16WV CE
C39	22448479	4.7μF 50WV CE
C40	22341102	0.001μF 50V P CK
C41	22341102	0.001μF 50V P CK
C42	22342103	0.01μF 50V Z CK
C43	22342223	0.022μF 50V Z CK
C44	22342223	0.022μF 50V Z CK
C45	22341102	0.001μF 50V P CK
C46	22342103	0.01μF 50V Z CK
C47	22342223	0.022μF 50V Z CK
C48	22342223	0.022μF 50V Z CK
C49	22342103	0.01μF 50V Z CK
C50	22342223	0.022μF 50V Z CK
C51	22342223	0.022μF 50V Z CK
C52	22342103	0.01μF 50V Z CK
C53	22342223	0.022μF 50V Z CK
C54	22373103	0.01μF 50V M MY
C55	22362120	12pF 50V K CC(SL)
C56	22381361	360pF50V J PS

SYMBOL	PART NO.	DESCRIPTION
C57,58,59	22342223	0.022μF 50V Z CK
C60	22448479	4.7μF 50WV CE
C61	22373103	0.01μF 50V M MY
C62	22373103	0.01μF 50V M MY
C63	22448479	4.7μF 50WV CE
C64	22448479	4.7μF 50WV CE
C65	22445470	47μF, 16WV CE
C66	22362100	10pF 50V K CC(SL)
C67	22373103	0.01μF 50V M MY
C68	22342103	0.01μF 50V Z CK
C69	22342223	0.022μF 50V Z CK
TR01,02,03, TR04,05,06		2SC380A-Ō
TR07		2SC1000-GR
TR08		2SC373
TR09,10		2SC373
TR11,12		2SC373
TR13		2SC734-GR
TR14		2SC372-Ō
TR15		2SC941-Y
TR16		2SC372-Ō
TR17		2SC380A-Ō
D01,02		IS1555
D03,04		IN60
D05,06		IS1555
D07,08		1S1555
D09,10		1S1555
D11,12		1S1555
D13		1N60
D14,15		1N60
D16,17		1N60
D18		1N60
D19		1N60
D20		1S1555
CF01,02,03	22153024	Ceramic Filter 10.7MHz
IT01	22267306	IFT-IT8475 Discri Trans
IT02	22265654	IFT-IT6479 FM Muting
IT03	22264643	IFT-1106B AM IFT
IT04	22264626	IFT-IT5477 AM IFT
IT05	22266308	IFT-IT5476 AM IFT
T01	22212026	COIL-ST3204 67KHz Trap
T02	22212029	COIL-ST1111 19KHz
T03	22212028	COIL-ST1112 19KHz Trap
T04	22212030	COIL-ST2306 38KHz
T05,06	22212027	COIL-ST2307 38KHz Trap
L01	22245232	COIL-RT7288 AM OSC

SYMBOL	PART NO.	DESCRIPTION
	MISCELLANEOUS	
PL901~905	22113211	Pilot Lamp, 8V 0.3A Dial (3 used) Meter (1 used)
PL201	22113238	Streo Indicator Lamp 6V 30mA
PL906	22113239	Pilot Lamp, 8V 50mA, pointer
M101	22104177	Tuning Meter
F901	22144139	Fuse, 2.0A, Pilot lamp
VR401~404	22638400	Volume, 250K ohm (B) 16ϕ (4 used)
S1	22146537	Rotary Sw, Selector
S2	22146538	Rotary Sw, Mode
S901	22146585	Rotary Sw, Power
S902	22148604	Circuit Breaker, 1.6A
S401,S101	22146502	Lever Sw, Tape monitor, Muting (2 used) without knob
S402	22146505	Slide Sw, BTL (2CH) - 4CH
SP501,502	22162131	Terminal, Speaker (2 used)
	22162258	Terminal, Ground
J001	22162278	Terminal, Antenna
J204	22163361	US Pin Jack, 1P
J401	22163351	US Pin Jack, 6P
J402	22163213	US Pin Jack, 8P
	22164311	Short Pin Plug (2 used)
J403	22167131	DIN Socket
J501,502	22163175	Headphone Jack (2 used)
J901	22167145	Voltage Selector
J902	22167138	AC Receptacle
T901	22213814	Transformer, PT-6019
L001	22242496	Ferrite Antenna
L002,003	22211145	Choke Coil, 1μH
C901	22321200	0.01μF AC 250V Film Capacitor
C902	22321201	0.022μF AC 250V Film Capacitor
R111	22544102	1K ohm K 1/8W RD
R112	22563681	680 ohm K 1/2W RC
R401,402	22544104	100K ohm K 1/8W RD
R403,404	22544153	15K ohm K 1/8W RD
R405,406	22544682	6.8K ohm K 1/8W RD
R409,410	22544332	3.3K ohm K 1/8W RD
R411,412	22544224	220K ohm K 1/8W RD
R413,414	22544823	82K ohm K 1/8W RD
R501,502	22563101	100 ohm K 1/2W RC
	A (TA, TC, VL)	
J903	22176221	Power Cord, UL, CSA
	25845120	Bush (SR-3P-4), Power Cord
	22751075	Bush (rubber), Ferrite Antenna
	B (VL, TE)	
	22863723	Name Plate, 100/120/220/240V
	22950284	Mask Label, AC Receptable mark
	C (TA, TC)	
	22863722	Name Plate, 120V

SYMBOL	PART NO.	DESCRIPTION
	D (TE)	
	20784074	Clamp, Power Cord
	22176286	Power Cord
	22751075	Bush (rubber), Ferrite Antenna, Power cord (2 used)
	E (VL)	
	22164314	Adaptor, Cemense Plug
	22164315	Adaptor, BS plug 2P